Canadian Journal of
PUBLIC HEALTH

VOLUME 38 TORONTO, SEPTEMBER, 1947 NUMBER 9

Public Health and the Practising Physician

WALTER L. BIERRING, M.D., Hon. M.R.C.P.(Edin.)

President, Conference of State and Provincial Health Authorities of North America
State Health Commissioner of Iowa
Des Moines, Iowa

AS administrators and physicians, we have come to recognize the increasing importance of a closer relationship between public health and the practising physician.

Public health and preventive medicine are the newest branches in medicine, and in spite of much misunderstanding are rapidly reaching the front line of social progress. In fact, public health, formerly termed State medicine, has made its first great inroads upon the domain of medical practice.

Preventive medicine and curative medicine can not be separated on any sound principle, and in any scheme of medical services must be brought together in close co-ordination. An eminent American surgeon a generation ago used these words—"prevention runs as a thread of gold through the entire fabric of medicine".

The medical profession has often misunderstood the purposes and objectives of public health, largely because fundamentally its basis seems different from that of medical practice. The latter has focused its eyes upon disease as it occurs in the individual patient, while the public health physician is more concerned with the health of communities and the broader aspects of disease, the morbidity and mortality rates, environmental protective measures, and the economic loss incident to disease. The latter field requires the co-operation of the sanitary engineer, the public health nurse, the statistician, the epidemiologist, and above all the spirit of the missionary.

Presented at a joint session of the Canadian Public Health Association and the Conference of State and Provincial Health Authorities of North America, Château Frontenac, Quebec, May 20, 1947.

The modern public health movement was founded upon the discoveries of the last six decades in the field of bacteriology. With the discovery of the etiological agents of many of the infectious diseases and their mode of spread, it became possible to institute preventive measures, such as water purification, sanitation, and food protection. It ushered in a new era in preventive medicine as well as in curative medicine.

As far back as 1873, Pasteur, the father of the new science, made the prophetic reflection: "May we not by analogy be justified in the belief that one day, simple and easily applied measures of prevention will arrest these scourges which at one blow desolate whole populations; as the terrible disease yellow fever, which has recently invaded the Valley of the Mississippi, or that other, bubonic plague, now raging on the banks of the Volga".

Some twenty years later, when Pasteur was still living, one of his prophesies came true. While a worker at the Pasteur Institute in Paris, there came one day in the early summer of 1894, the pathological material and pure cultures of the bubonic pest bacillus from Yersin in China. The mode of infection was made clear, and means provided for preparing a prophylactic vaccine. Six years later the Walter Reed Commission in Cuba demonstrated the transmission of yellow fever by means of the stegomyia mosquito, marking the way for preventive measures and making the construction of the Panama Canal possible and the tropics habitable for the white man.

The effective control of malaria, typhus, and other tropical diseases during World War II will form an epic story in preventive medicine throughout the years to come.

With each new discovery in this virgin field of scientific endeavor, the interdependence of the public health worker and the practising physician has become more marked. This was specially evident with the advent of the public health laboratory, particularly in the facilities offered for diagnostic cultures in diphtheria, typhoid, pneumonia and brucellosis, animal inoculation in tuberculosis, early recognition of the different species of malaria parasites; specific agglutination tests in typhoid, undulant fever, Rocky Mountain spotted fever, the recognition of rabies, the significance of the Rh factor, serological tests for syphilis, and the preparation of vaccines, antitoxins, specific therapeutic sera, convalescent serum for measles, whooping cough and scarlet fever, and more recently blood plasma and other blood derivatives.

The practising physician would feel helpless without these diagnostic facilities, and the further aid in the control and treatment of many infectious diseases. Again, without the active co-operation of the practising physician, the epidemiologist would be likewise hindered in accomplishing the best results.

With the organization of full-time local health services under the direction of adequately trained public health personnel, the gospel of modern public health service has been further extended on a community basis. The practising physician is beginning to recognize the purpose of full-time services to improve community health and is lending his support in every way.

The introduction of penicillin, a product of the bacteriological laboratory, has revolutionized the treatment of syphilis, gonorrhoea, and many of the

pyogenic infections. Another antibiotic, streptomycin, offers considerable promise in the treatment of tuberculosis, brucellosis and several other infectious diseases.

We are aware that many scientific achievements in the last few years have not yet had their full impact on medical practice, yet with the increasing use of antibiotics in infections, it is possible to foretell that in the next ten years many infectious conditions now requiring surgical treatment will be successfully controlled by non-surgical means. It is further probable that surgical treatment of thyroid disorders will also be less frequent.

With the conquest of the communicable diseases of the early years of life, and more recently of bacterial infections at all ages, the problem of our progressively aging population, the so-called degenerative processes—cancer in all its forms and the deficiency diseases—are assuming increasing importance in the field of general practice, and generally accepted as definite health problems. As the life span has been lengthened some thirty years, we are gradually becoming a population of elderly people.

These newer problems of public health are definitely changing the pattern of medical practice and at the same time distinctly modifying the functions of the public health administrator, as well as the character of approach to bring these diseases under control.

The conquest of infectious diseases was most successfully accomplished through mass attack, which, however, can not prevail in applying the principles of preventive medicine in this new field of public health activity.

The early recognition, possible arrest or cure of the degenerative and deficiency diseases comes properly within the field of the practising physician. He holds the key position in this new frontier of medical investigation, and is better able to recognize early signs through intensive study of the individual patient, particularly as regards reactions to life and environment and various social influences.

The practising physician, however lofty his ideals, has not realized the changes in his environment which medical science and social re-orientation has brought about in this industrial age. It is further evident that the practising physician is losing prestige and authority in that broader field—the social aspects of disease. He is being taken from the home of the sick to the hospital ward and his professional office, where he is losing touch with the hereditary, family, home, personal and economic environments of his patients, and where he was formerly better qualified to judge of their importance in disease than he is today. As a result, social agencies are taking over where he left off—the social worker, the nurse, and the various public health services, who must now be specially concerned with the environmental factors and the social implications of health.

Within the coming decade medical practice will centre more and more around the modern hospital. The extensive hospital construction program now coming under way in the United States, and equally so in Canada, with its proposed integrated system and close functional affiliation between health centres, diagnostic clinics, community and regional hospitals, will distinctly

influence the pattern of medical practice as well as the distribution of qualified physicians. The modern hospital will likewise become the centre of extending health education, and preventive medicine will be one of its important services.

An important factor to be considered is the increasing trend of medical graduates to limit their practice to a specialty. When the late Lord Horder of England was visiting this country in 1896, he expressed deep concern that the spread of specialism would submerge the general practitioner.

An extensive study of Weiskotten, in 1932, indicated that 34 to 40 per cent of the medical graduates of 1915, 1920, and 1925, were limiting their practice to a specialty, the more recent graduates showing the higher percentage. As a result of this study, Weiskotten made a startling statement that 70 per cent of the medical graduates each year will eventually limit their practice to a speciality.

According to the last directory of specialists, there are at present approximately 26,000 physicians certified in one or other of the fifteen medical and surgical specialties. To this may be added nearly an equal number of physicians who are part-time specialists, giving attention to some form of specialized practice, in connection with general practice.

In each of the specialty boards there is now a tendency to increase the requirements for certification, and limit the diplomate more and more strictly to the specialized type of practice concerned. This procedure, commendable as it is, is removing each year an increasing number of highly qualified physicians from the field of general practice. As the qualified physician is withdrawn from general practice, there is great danger that this service will be taken over by less competent and less adequately prepared practitioners.

This limitation of medical practice within restricted fields has exaggerated the need for the adequately trained and experienced general physician. This is one of the most important problems facing the medical profession and all those agencies concerned with public health. There is definitely a need for a re-education of the public regarding the important role of the general physician in meeting the demands of modern society for the highest type of general medical service.

In the past few years there has been a growing public demand for the further entry of the State into the field of medical care. Here in Canada you have advanced further in that direction than we have in the States. In both countries the institutional care of mental disease, tuberculosis, and to a lesser extent venereal disease has been the responsibilty of Government. It is difficult, however, to contemplate any plan that would entirely remove the medical and surgical care of the individual patient from the responsibilty of the qualified practising physician.

In the field of industrial hygiene, and in preventing the hazards of industry, as well as the control of occupational diseases, the practising physician has the further opportunity of applying the principles of preventive medicine. As Dr. Boudreau will no doubt present to you in his address tomorrow, poor nutrition is always associated with high death rates and a low expectation of life, high mortality in infancy and early childhood and among women during the child-

bearing period, with increased susceptibility to many diseases such as tuberculosis and particularly as to impaired working capacity. Nutrition is definitely becoming a public health problem, and therefore distinctly a responsibility of Government. Here again, in this new field of public health, the practising physician will have an important role.

In the many case-finding programs in tuberculosis instituted by public health agencies in conjunction with special tuberculosis societies, involving particularly massive miniature chest-film surveys, many an abnormal chest condition, both of the heart and lungs, is brought more promptly to the attention of the attending physician.

The development of rapid treatment centres or clinics for syphilis and gonorrhoea with the careful scrutinizing of the therapeutic benefits of the newer antibiotic remedies is pointing the way for the treatment of these diseases by the practising physician, either in private office or hospital service, as a part of the general routine of his practice.

The development of community clinics and extensive educational programs in mental hygiene for the better mental health of our people, opens up a further opportunity for the closest co-operation of these two agencies.

The preventive aspects of disease should offer to the practising physician an opportunity for useful service equal to that of diagnosis and treatment. Thus in these many fields of preventive medicine the public health administrator and the practising physician can meet on common ground, and by sustained and organized effort attain more readily the ultimate goal of optimum health for the individual and the community.

A Program for the Control of Cancer

W. D. STOVALL, M.D.
Director, Wisconsin Laboratory of Hygiene
Madison, Wis.

IT is like bearing coals to Newcastle to talk about the control of cancer to a group of public health officials. However, I accepted gladly the invitation to meet with you, and I thank you for the opportunity to participate in this conference.

As knowledge has advanced, a new approach and a new significance has been given to the diagnosis and the treatment of disease. Etiological diagnosis has taken the place of anatomical. Specific treatment has replaced old and empiric methods. New methods of diagnosing disease and treating the patient have become important in the control and prevention of disease. Prompt and early diagnosis, prompt and adequate early treatment are now recognized as instruments of public health practice and as a means of preventing and controlling disease, at least of equal importance to that of environmental sanitation. As a result of this change in concept, those diseases which are not communicable, but nevertheless of major importance as causes of invalidism, chronic and disabling illness and deaths, have come to be encompassed in the field of public health and constitute a new field for public health practice.

Among these is cancer. It represents one of the main causes of death and, apparently, its incidence is increasing. In the ten-year period, 1930 to 1940, the population of the United States increased 7 per cent; the total number of deaths, 2 per cent, while the deaths from cancer increased 35 per cent. Whether this represents an actual increase in the incidence of cancer, or is an expression of improvement in the methods of diagnosis, has little significance here, since this disease accounted for over 170,000 deaths in the United States last year, and an incidence of something over 600,000 cases. Although science has brought many changes in the methods and accuracy of the diagnosis of all diseases, it is doubtful if these advances had spread rapidly enough during this single ten-year period to account for the increase in the incidence of cancer.

Methods devised for the control of cancer, like those devised for the control of any disease, are of necessity preceded by the accumulation of new knowledge. Out of this knowledge, new concepts are formulated and techniques for their implementation are developed. A complete understanding of the new knowledge, a thorough familiarity with the new concepts, and a mastery of the new techniques are essential to the successful planning for the control and prevention of cancer. The recognition of the problem is not enough. Late cancer has been recognized as an incurable disease for centuries, and early cancer as curable for

Presented at the Conference of State and Provincial Health Authorities of North America, held in the Château Frontenac, Quebec, May 20-22, 1947, in conjunction with the annual meeting of the Canadian Public Health Association.

almost two thousand years. Aurelius Cornelius Celsus (30 B.C. to 38 A.D.), the great Roman physician, stated this in a remarkable aphorism: "Every cancer not only corrupts the part which it has seized, but spreads further. Only the beginnings of a cancer admit of a cure, but when 'tis once settled and confirmed, 'tis incurable and the patient must die under a cold sweat." He recognized the problem, but he had no knowledge of the biology of cancer. Therefore, he formulated no concept and devised no technique for its control.

We, today, state the problem as a slogan—"Early cancer is curable"—because we have at least enough knowledge of the biology of cancer to recognize its curability in the early stage, and science has supplied us with the techniques by which this knowledge can be applied. A brief review of this knowledge and how it was obtained is pertinent to this discussion.

The beginning of our knowledge of the structure of cancer goes back only to the middle of the last century, when it was found that the tissues and organs of the human body are made up of individual functioning units—cells. The detailed structure of cancer has been shown to be cellular. Schleiden (1838) first gave the idea of the cellular nature of organic life, particularly plants, and Schwann, in 1839, applied this more particularly to the human body. Bichat (1771), in his famous treatise on membranes, created a new science, general anatomy, which had up to this time been concerned with the gross divisions of the human body. His work acts as the connecting link between Morgagni and gross pathology and Virchow and histopathology. Virchow developed the concept of the pathology of the cell, and, in his paper, "Cellularpathologie", he said:

> "Especial difficulty has been found in answering the question, from what part of the body action really proceeds—what parts are active, what passive; and yet it is already quite possible to come to a definitive conclusion upon this point, even in the case of parts the structure of which is still disputed. The chief point in this application of histology to pathology is to obtain a recognition of the fact that the cell is really the ultimate morphological element in which there is any manifestation of life, and that we must not transfer the seat of real action to any point beyond the cell."

The first use of dyes in microscopic work seems to have been by Hill, in 1770. However this may be, the introduction of aniline dyes by Weigert, and the development of staining technology, has added immeasurably to our knowledge of the morphological and structural parts of cells as well as their architectural arrangement in the organs and tissues of the body. This method of study, employed in the microscopic examination of malignant tissue, has given us knowledge concerning the structure of cancer, that is, the morphology of the cancer cell and the anatomic relation of its component parts (cytoplasm, nucleus, nucleolus), and also to the disturbance of the architectural arrangement of these cells. This contribution has made possible the technique for the microscopic diagnosis of malignant neoplasms and has revealed the course and manifestation of cancer in different parts of the body. Out of it has come our concept of the development of normal tissues and organs and a concept as to how cancer disturbs this development.

Normal cells multiply, divide, and organize to produce an architectural arrangement which conforms to the mechanical needs of the function of the particular organ. Cancer, as revealed by histological studies, is a modification of the morphology of normal cells, a change in the staining reaction, displacement of their normal arrangement, and a disregard for the normal cellular replacement needs.

Descriptive studies have shown that there are differences in the structure of cancer itself, in the rapidity of growth of various cancers, in their tendency to the formation of secondary foci, in their reaction to X-ray and radium, and last, but of great importance, that it does not involve in the beginning all of the cells of an organ but only a small group, possibly one cell. This means that cancer, in its beginning, is not a systemic disease but a local disease. All of this is a most important outcome of cancer research by clinicians and pathologists, and provides a sound and broad basis for work on the fundamental problem of the early diagnosis, the adequate treatment and, therefore, the control of cancer. But, before we proceed with the discussion of a program of systematized community action for the control of cancer, we should briefly consider the newer information on the biology of cancer which has accumulated as the result of experimental methods.

The history of cancer research can be divided into two epochs—the empiric or descriptive, which we have just reviewed, and the experimental, which may reveal information from which a program of prevention, as contrasted to control, may be derived.

Dr. Van R. Potter (1), in discussing the role of nutrition in cancer prevention, recently made the following remarks: Investigators have come to realize that the development of a cancer is not confined to the grossly visible events, but that there are a series of imperceptible changes which precede the actual eruption of a cancer. These events have been divided into three steps:

I. Induction period.

II. Critical period.

III. Period of progression: Result of release from restraint of normal cells.

In the first period, the induction period, the disease may be initiated by a variety of environmental factors, excessive exposure to sunlight, excessive irradiation, including ultraviolet, chemical carcinogenic agents, such as are found in certain industries, and in some instances, heredity effects. However, the fact that cancer cells develop as a result of any of these causes does not within itself mean that a cancerous tumor will develop.

In the second phase, environment plays, apparently, a very important part as to whether the cancer cell goes on to the development of a malignant tumor or is destroyed and eliminated from further action by biological processes of the normal cells. Experimental work has brought much evidence to bear upon the influence of environment upon the development of cancer.

One of my colleagues, Dr. H. P. Rush (2), has reviewed and by experimental methods obtained information on the influence of restricted caloric intake upon the control of cancer in colonies of mice where its incidence is high. He used four groups of forty-eight young adult mice per group. Two of the

groups received a high carbohydrate diet; the other groups received sufficient calories to maintain their body weight. Those mice on the restricted caloric intake were not emaciated or unhealthy, but they were constantly searching for food in their cages, showing that they were hungry. The groups, therefore, constituted one high caloric group and one low caloric group. For five months no cancer appeared. Then, in the high caloric group cancer began to appear. At nine months, none of the high caloric group remained. Six of the forty-eight died from unknown causes, and forty-two, or 88 per cent, had developed cancer. Among the low caloric mice, only one, which is 2 per cent, developed cancer.

The influence of heredity has figured prominently in the experimental studies of the fundamental biology of cancer. In the early part of this century, the basic particles which lie in the chromosomes of the nucleus of the cell and their arrangement along the chromosomes was determined and it was found that the biology of the cell is determined by these self-duplicating substances (genes). Soon after this it was observed that occasionally cells undergo a sudden change which is permanent and imparts a new and different quality and a new set of characteristic chemical reactions to the cell. The organism which results from these changes has been recognized as a mutant and the change itself as mutation. Recently, Spiegelman (3), in an effort to get a better understanding of sudden heritable change in somatic cells, has used the growth of yeast cells in various substrates or media. Out of this work he has developed some well-defined concepts of the nature of gene action. His findings and conclusions he has stated as follows:

> 1. Usually, the transmission of characteristic enzymes and the products of their activities follows the classical Mendelian laws derived from the assumption that the controlling units are self-duplicating entities, genes, located on chromosomes in the nucleus.
>
> 2. The existence of a particular gene in the nucleus of a cell does not guarantee that the corresponding enzyme will be found in the cytoplasm, as evidenced by such phenomena as cellular differentiation and enzymatic adaption. Genes, therefore, have as their primary function the indefinite retention for the cell of the potentiality for enzyme formation.
>
> 3. The actual formation of an enzyme in the cytoplasm is mediated directly by a cytoplasmic unit (plasmagene) which possesses the capacity for self-duplication in the presence or absence of the corresponding gene.
>
> 4. The presence of the homologous substrates accentuates the capacity of these self-duplicating plasmagenes to produce enzyme.
>
> 5. Competitive interactions exist amongst the cytoplasmic enzyme-forming units.
>
> 6. Nucleoproteins are involved in the synthesis of enzymes.

We may at this point ask these questions: Is the cancer cell produced by various environmental factors which modify the cytoplasmic gene and thus change the enzymic composition of the cell? Or, is the cancer cell a cell in which the enzymatic composition has been changed by the effect of environmental

factors upon the self-duplicating plasmagenes? All of the evidence, both from descriptive and experimental research, points to this conclusion.

The greater incidence of cancer in diabetics than in the population at large, the occurrence of cancer of the skin more frequently among those who are exposed to wind and sun, the relation of lower-income groups and the occurrence of cancer, the observation of chimney-sweep cancer made in 1775 by Percival Pott—this is even more striking in view of the discovery of carcinogenic agents—and the evidence of the influence of ultraviolet rays in the production of cancer, the control of cancer among rats in a colony which shows a high incidence of cancer, and much other evidence, is strong supporting evidence of the significance of environment to the incidence of cancer.

The present cancer control program, marshalled under the slogan, "Early cancer is curable", is based upon accumulated descriptive knowledge of it and its course and manifestation in the human body, together with the technical practices which are now available for its early diagnosis and adequate treatment.

The accumulation of knowledge by experimental methods concerning the multiple environmental factors which may cause cancer suggests that avenues for its prevention are opening up, and that the new slogan may be "PREVENT CANCER WITH KNOWLEDGE."

The known facts regarding the diagnosis and treatment of cancer and concerning its etiology have intrinsic value in the formulation of a control program. This control program, in the light of the information which has been reviewed, may be briefly stated as follows: All existing knowledge indicates that the control of cancer requires the expansion of diagnostic and treatment facilities, not necessarily hospitals, making this available to all people, both urban and rural; the development of a sustained and effective educational program for both the profession and the public—this can be accomplished only with the co-operation of official and voluntary health agencies; the development of pathological laboratory services available to medical practitioners in rural areas and small hospital centres as well as in the larger urban areas, the organization of a tumor registration centre in public health laboratories and a service of microscopic diagnosis of the smear method of Papanicolaou, the establishment of centres for the examination of well people for the early detection of cancer; the organization of cancer clinics, both diagnostic and treatment; the creation of statistical research bureaus for the accumulation of information on environmental factors influencing the incidence of cancer, on constitutional factors in human cancer, on the mortality and morbidity rates of various cases of cancer and the effectiveness of various methods of treating different varieties of cancer. To accomplish this there must be established a cordial co-operation between official health boards and all hospitals, physicians, voluntary organizations, and the general public.

The control of cancer is not a one-man job, nor can it be done in highly specialized centres, far removed from farms and homes located in the counties, villages and small cities throughout the country. Cancer must be diagnosed in the locality where people live, if it is going to be diagnosed early. Small and early lesions that give no pain and cause little inconvenience will not prompt people to leave their homes and occupations to visit distant cancer centres for diagnosis

and treatment. The control of cancer requires the practice of preventive medicine in its most refined form, and it (preventive medicine) is not a specialty in the field of medical practice. It belongs to no group of specialists. It covers all divisions of medical practice and requires the unhesitating consultation between pathologists, radiologists, surgeons, various other specialists, and the general practitioner of medicine. The correlation and integration of all of these activities is a job for the health department.

BIBLIOGRAPHY

1. Potter, Van R.: The Role of Nutrition in Cancer Prevention. Science, 1945, Feb. 2, 105.
2. Rusch, H. P., Kline, B. E. and Baumann, C. A.: The Influence of Caloric Restriction and of Dietary Fat on Tumor Formation with Ultraviolet Radiation. Cancer Research, 1945, *5:* 431.
3. Spiegelman, S.: Carcinogenesis and the Mechanism of Gene Action. Cancer Research, 1947, *7:*42.

Possible Trends in the Public Health Laboratory Diagnostic Service

A. L. MacNABB, D.V.M., D.V.Sc.
Principal, Ontario Veterinary College, Guelph

TODAY, as a result of the war and scientific advances, there is a trend toward increased public health consciousness in conditions affecting human life. Such a trend calls for certain changes in the services and facilities which may be offered to the community. Among these current changes is the challenge which today faces public health laboratory service, as it relates to the public health diagnostic laboratory.

Fifty-one years have passed since the first public health laboratory was established in Canada. It is of interest to us to note, at this time, that the reason for the establishment of that first laboratory, in 1895, was the prevalence of rabies infection among dogs and the spread of the infection to other livestock. The original laboratory was supported by funds provided through an agricultural grant. This arrangement did not last long, although public health laboratory personnel were appointed. Our public health fathers can look back with a great deal of pride and satisfaction at the progress which has been made, considering that it is little more than thirty years since the introduction of diphtheria antitoxin and less than twenty years since that of scarlet fever toxin and antitoxin, and that T.A.B. distribution was first instituted during World War I.

The enteric-disease field is much more complex to-day, as a result of studies by Bruce, White, Savage, Kauffmann, Felix, and others. The development of the test method by Craigie, as a result of which strains of *S. typhi* could be classified as to their lysogenic property, marked a further stride. This was of definite value to the epidemiologist.

The original intention of the public health laboratory was to make a study of communicable diseases and to assist in assuring a suitable public water supply. The value of the laboratory in the supervision of water and milk supplies was early shown. In 1904, observations made by Park and others demonstrated that, where the bacterial content of milk consumed by children was low, there was a corresponding decrease in the incidence of gastro-intestinal infection. The diagnostic laboratory's reliable information on the date on which convalescent diphtheria patients could be released from quarantine, the introduction of a Widal test for typhoid, and the introduction of the Wassermann test all consolidated the laboratory's position.

These early observations and contributions laid down a firm foundation, from which public health and medical diagnostic work has developed and

Chairman's Address at the fourteenth annual Christmas meeting of the Laboratory Section, Canadian Public Health Association, held in the Windsor Hotel, Montreal, December 16 and 17, 1946.

broadened. The last thirty years have witnessed revisions of old test methods, deletions of others, and the development of many new diagnostic aids. The public health laboratory has been called upon for service as a general diagnostic centre for the community.

With the field of public health service becoming ever broader, it becomes increasingly necessary for public health administrators to include on their staff selected members trained in the various aspects of biological science. The tendency to restrict such a move will result in an unbalanced service. The biologist, agricultural specialist, and veterinarian all have valuable contributions to make.

The veterinarian's services are essential to public health work. Veterinary medicine protects the commercial value of animal products. Public health medical personnel have observed that nowhere in the world is it possible to find a successful health program where an animal industry is not established. Most pronounced mineral and protein deficiencies in the human diet prevail in communities not supporting a good animal industry. There is a direct correlation between communities that support an extensive animal industry and areas which have a reasonably good living standard. It is impossible for the animal industry to flourish without adequate veterinary service.

Certain communities have become cognizant of the need for veterinary services. In the United States, the relation of the veterinarian to the field of public health is being reviewed. The justification for this is found in the fact that there is a direct relationship between the incidence of disease in man and the incidence of the same disease among animals. Despite the increasing number of animal infections now recognized, those of an enzootic nature have largely been eradicated from the North American continent. The 36 animal infections known to be transmissible to man present public health problems and demand a place for the trained veterinarian in the diagnostic field.

In the United States, during the interval from 1927 to 1943, inclusive, there occurred 38,508 cases of human undulant fever infection, of which 1,340 cases terminated fatally. Infection of the human gastro-intestinal tract is most important. Stafseth has identified 32 Salmonella species strains, of animal origin, from poultry. The importance of Salmonellosis in other domestic animals, especially swine, surely places the study of bacteria in humans and in animals on a common base.

A glance at the field of virology, also, shows that its problems are common to both humans and animals. This is proved by Howitt's identification of the encephalomyelitis virus strain, and Giltner's identification of the Eastern equine strain. It has been shown that the St. Louis strain of virus can affect the horse, just as the equine or horse virus can affect man and infect vast multitudes of human beings.

The advances made in the field of virology have afforded the laboratory the opportunity of establishing diagnostic aids. I have in mind the condition, equine encephalitis, the incitant virus with pantropic tendency. This virus is present in the blood during very early stages of infection. During the second week, complement-fixing and neutralizing bodies appear, thus making available

the neutralization test and the complement-fixation test as a diagnostic aid. The results of research relative to psittacosis infection, the specificity of the complement-fixation test, and the more recently introduced slide test by Labzoffsky make this latter test a method of practical application.

This brings us to a realization, therefore, that there is a definite need for regional laboratories equipped to conduct advanced diagnostic tests. The graduate in human medicine cannot hope to cope with the entire breadth of diagnostic service which is demanded. Diagnostic service laboratories to be established should be constructed so as to include graduates from the various branches of biological science. It is obvious that diagnostic work in connection with specimens for sanitary analysis, food samples for microbiological examination, and examination for virus infection is better placed in the hands of the highly trained technical worker with a broad experience along this line than with a graduate in the larger and more general fields of human or veterinary medicine.

A consideration of the diagnostic-service field should include a discussion of the best manner in which service can be rendered. We all know today how futile is a delayed blood-level report during sulfa or penicillin therapy, or in any of the other recently introduced tests. In other words, as a diagnostic aid a mail laboratory service is of limited value. This holds true of work with both humans and animals.

The Ontario Veterinary College, following the precedent set by public health services, will establish diagnostic centres throughout the Province, so that a more reliable service will be available. This will provide for some diagnostic tests which would not be available if a prolonged period were required between despatch of the specimen and arrival of the report.

The greatest contribution which either agriculture or public health can make to a country's welfare is to improve the lot of the rural citizen engaged in agricultural production. The improvement may be effected first by way of encouragement from an economic aspect. Second, but most important, is improvement in the medical and public health facilities offered to the rural citizen. Would it not be feasible to have, in communities now without any laboratory service whatsoever, a community centre where the more simple laboratory diagnostic tests could be made for physicians, and where a technical worker could do blood grouping, store blood plasma, examine smears, and conduct all counts? In the case of technical work of a bacteriological nature, the specimens could be forwarded to a regional laboratory for confirmation and for further advanced study when necessary. The services could be performed at a minimum cost. In this way, rural citizens would feel that service was readily available—except in certain cases, of course, where it will always be necessary for them to go to special centres for special treatment.

We, as public health laboratory workers, have too frequently been guilty of assuming the attitude of so-called "nuisance" specimens. Let us consider, for example, the field of tuberculosis. As desirable and necessary as is the present program of mass X-ray projects, a diagnosis of a minimal-lesion case of pulmonary tuberculosis should not be made on X-ray finding alone. The medical radiologist needs to make frequent use of the laboratory, therefore, to assure

that cultural examinations of sputum and stomach-lavage specimens do not yield tubercle bacilli. Laboratory workers are too prone, when repeat specimens are submitted, to overlook the significance of these. The problem is so important that specimens should be submitted again and again, and the laboratory should never fail to examine each and every specimen. The hospitalization cost, in one case of neglect or error, may amount to more than a laboratory worker's salary for one year. Surely a full and complete laboratory examination is justified.

As a result of public health education and a change in our way of life, there has been a trend toward hospitalization of the sick. This increased demand for hospitalization has created certain problems, especially for those institutions having a bed capacity of 100 beds or less. The hospitalization trend has evoked a tendency toward increased use of laboratory service. The discovery and application of sulfa therapy marked a forward stride, only to be surpassed by the introduction of the life-saving antibiotic, penicillin. These changes have removed the need for certain immediate bedside laboratory procedures, as they relate to the routine typing of pneumococci and to the production of pneumococcal serum for therapeutic use. The virologists have produced evidence that conditions caused by certain virus agents can readily be demonstrated. Thus they have introduced diagnostic means which are now the responsibility of each and every well-balanced regional laboratory. I have in mind cases presented for diagnosis affected with equine encephalomyelitis, smallpox virus, lymphochorio-meningitic virus infection.

We turn now to the question of laboratory technicians. When I refer to technical workers or technologists, no statement I make is levelled at any organization now in existence. The advances made in knowledge in the field of biological science necessitate an improvement in pre-technical training. A few years ago, a senior technical worker could be chosen from a field of individuals without even high-school training. This is not true today. While it is true that a generous allowance must be made for the individual effort, for varied experience and intensive application, on the other hand senior technical workers today must have at least adequate basic training prior to their appointment.

Hence there is need for an accurate inventory of technical workers serving in the diagnostic field. I refer especially to technical workers who are not graduates of an academic institution, and who are serving in laboratory posts not under the direction of a pathologist or bacteriologist. There is a need also for regional training-centres which such laboratory workers can consult, to which they can refer, and at which they can report at least once a year for a refresher course of both practical and lecture-course instruction. Such a school should be under university guidance.

The need for the grading of technicians is urgent. Let us consider small units, where laboratory work justifies a graduate nurse's services for only one or two hours per day, for urinalysis and smear-examination work. The occupant of such a post is engaged in other duties for the remainder of the time. Such part-time laboratory workers must have adequate instruction, to do well the tasks which are assigned to them; and they need free access to consultant service for any revision in stain methods when available.

Laboratory workers may be classified as follows:

1. The part-time worker in a small institution.
2. The full-time laboratory assistant, who might be termed Grade I, working either in bacteriological or chemical work.
3. The senior type of technical worker who conducts electrocardiograph and pathological tissue preparation, haematological, and a limited amount of bacteriological work.
4. The laboratory worker who is a graduate of an arts faculty in which a course of instruction has been taken in biochemistry, haematology, and other related subjects, in connection with diagnostic procedures.

Hence, one can readily see the need for a registry or laboratory board. This board should have representatives from each of the medical teaching centres, from bacteriological associations, from the Chemical Institute, and one member from a technicians' organization.

Such a provincial laboratory board could refer important matters to a central or federal board, which would be comprised of members of the medical profession and representatives from the hospital association and the department of health. I know of no better method of organizing such a laboratory board than through the agency of government, university, and the Canadian Public Health Association.

Argument Against Isolationism

It is true that the hospital laboratory is a centre of great importance, and that it has enough work in the institution it serves without any additional burden. On the other hand, regional public laboratories could render a much broader service to the community if they were designed to work not only on the diseases that affect man, but also on those that affect animals, and on the various food technological problems which occur. This desirable change cannot be wrought by wishful thinking, but is a problem which could be solved if the Canadian Public Health Association were to initiate action in a spirit of co-operation with the appropriate bodies. Such regional centres might become real sources of influence and service. Furthermore, the need for scholarships or bursaries is urgent, so that young men of limited means can acquire postgraduate training or experience. Is it not the task of the Canadian Public Health Association's Laboratory Section to institute such a program?

We have, moreover, not only the problem of the junior technician, but also the question of non-medical bacteriologists. Graduates in human medicine are now certified by the Royal College, and justly so, for both pathological and bacteriological work. The non-medical bacteriologist has no certificate. May I stress the importance of this group. Inasmuch as these individuals have successfully passed and fulfilled the obligations of an undergraduate course in biological science, and have received intensive training and instruction in chemistry, biochemistry, embryology, haematology, and, in some cases, a limited amount of training in pathology, surely there is need for some form of certificate. By certificate I mean that some definite office, bureau, or recognized authority would

recognize these various workers, who are either bachelors or masters of science, or doctors of philosophy.

This group is a most important group in the field of public health. It represents a varied field of learning. These men have chosen laboratory work—be it routine, diagnostic, or research—for their life career. Therefore, the greatest contribution which will be made will come from this group. I do not wish to be misunderstood in any way. I recognize that the medical graduate, and rightly so, should be the director of any hospital laboratory, and in charge of all tissue-examination work. In all fairness, however, we must admit that in the field of milk sanitation, and the studies embracing a knowledge of entomology, parasitology, and food technology, the non-medical worker is the key officer. He will many times show the way. Research has played the predominant role, and has necessitated the creation of specialities within laboratory services. Therefore, in public health there should come to focus mutual interdependence of the various branches of biological science.

Public health work must depend also upon the natural sciences. The increasing need for co-operative relationship with sociological science will give greater scope to public health services in terms of public relations and responsibility. We must elevate the laboratory worker's sphere of influence, therefore, so that he will have adequate support to carry on effective humanitarian activity.

There is a definite need for an institution to deal with these various diagnostic problems.

The Diagnosis of Rheumatic Fever and Rheumatic Heart Disease

Part II

JOHN D. KEITH, M.D.

Recurrence of Rheumatic Heart Disease

ONCE rheumatic heart disease is present, it is often very difficult to tell if, in a subsequent attack of rheumatic fever, further myocardial or valvular damage has developed. Clear evidence is presented if the heart becomes enlarged; if any of the recognized e.c.g. changes occur; if pericarditis occurs; if a new murmur appears, such as aortic diastolic, mitral diastolic, or a marked accentuation of the first sound with a much louder apical systolic murmur; if signs of heart failure appear; and if a gradual decrease in exercise tolerance develops.

But very frequently these signs do not develop and, even though you suspect further myocardial or valvular damage, such a supposition obviously will not do for scientific criteria. For practical purposes, however, when active rheumatic infection is present it is necessary to treat the patient as if active heart disease existed also.

Arthralgia

The typical picture of rheumatic arthritis is characterized by an onset of symptoms a few days to four weeks after a streptococcal throat infection. The joints then become red, swollen and tender. Several joints become involved, sometimes together and sometimes one after another; typically, the larger joints such as knee, wrists, ankles and elbows. It is a migratory arthritis, moving from joint to joint during the acute illness. Fever is usually present at the onset and the sedimentation rate is raised. There is prompt improvement, as a rule, when adequate doses of salicylates are administered, but whether salicylates are given or not, it is rare for signs and symptoms to persist in any one joint longer than a week. This is useful in differentiating other forms of arthritis. Recurrent arthritic symptoms sometimes appear again after an interval but this is less likely to occur when adequate doses of salicylates are administered.

However, typical arthritis is not so frequently encountered in rheumatic children. For this reason, the term arthralgia covers the variations in signs and symptoms of the joints better than the term arthritis. Arthritis is usually taken to mean red, swollen, tender joints, while arthralgia would also include those that have pain or tenderness without swelling.

Arthralgia without any other rheumatic manifestations is not considered diagnostic of the disease. It is necessary to have other evidence as well.

From the Hospital for Sick Children and the Department of Paediatrics, University of Toronto, under the direction of Alan Brown, M.D., F.R.C.P.(London).

The minimum required would be an arthralgia which involves at least two joints, coming on a few days to four weeks after a sore throat, with the laboratory finding of a pathologically elevated sedimentation rate.

The evidence is even more convincing, however, if in addition the conduction time as shown in the electrocardiogram is lengthened to more than .20 seconds. An equally significant finding is the presence of erythema marginata (a circinate slowly changing rash with a purple-red colour appearing chiefly over trunk and arms). The other minor manifestations, as a rule, contribute little in making an accurate diagnosis.

The diagnosis is beyond doubt when the arthralgia coexists with rheumatic carditis, chorea, or nodules.

Other points to consider when evaluating a patient with arthralgia are:

1. Aches and pains occurring with onset of an acute infection should not be confused with rheumatic fever.

2. Mild, transient joint pains without swelling and without fever or raised sedimentation rate are usually not due to rheumatic fever.

3. Muscle pains are usually not rheumatic fever, especially when sedimentation rate and temperature are normal.

4. A mild arthralgia continuing for several weeks with a normal heart and no elevation of the sedimentation rate, is rarely due to rheumatic fever.

5. In acute rheumatic fever, the sedimentation rate is almost invariably increased well above normal levels (usually above 50 mm. by the Westegren method). If it is normal, one should be very suspicious that one is not dealing with acute rheumatic fever.

The borderline between rheumatic fever and other forms of arthritis is not always distinct enough to permit a definite diagnosis at the beginning of symptoms in many cases, and a period of observation, either in hospital or at home, is necessary before coming to a decision.

Rheumatic Fever and Growing Pains in Children

The differentiation of rheumatic from non-rheumatic leg pains in children is a particular problem in itself. Some of the pains used to be referred to as growing pains; and in many instances they were unimportant aches, but not infrequently they were significant evidence of rheumatic infection. To aid in interpreting these complaints, the following points are set down:

If the child has heart disease, any pains are usually considered rheumatic until proven otherwise. The cases that are problems among the child population are those that have no evidence of heart disease and yet complain of pains in joints or muscles or tendons. The most useful point in diagnosis is the history that these pains have occurred for some time. Then if no heart disease is apparent, the pains are almost certainly not rheumatic. Children frequently complain of pains behind the knees and point to the tendons of the calf muscles. These are rarely rheumatic. Another type of rheumatic pain is that occurring at night after a child has gone to bed. Usually a mild rheumatic pain is relieved by the warmth of bed-covers while these pains appear at this time and are rarely associated with any demonstrable pathology. Frequently this type is functional. Non-rheumatic pains are commonly

found in legs and thighs, rarely in the arms; the muscle is more often involved than the joint. In rheumatic fever the joints of both upper and lower extremities may be involved. It is useful to have the child himself point to the site of the pain. It is not common to find frank muscle pain in rheumatic fever.

When there is doubt, a sedimentation rate or white blood count may be of value. In active rheumatic infection both of these are usually elevated. If the heart is normal and the sedimentation rate is not raised, one can usually dismiss the pains as unimportant.

The most common type of pain found in a cardiac clinic where a variety of cases are sent for diagnosis is the one occurring in the legs that is non-rheumatic in origin. The heart is not involved. Over a period of time the pains may appear intermittently but no heart disease develops. Such cases stress the importance of several visits before reaching a conclusion in these children.

Chorea

A chorea is a symptom complex which is closely related to rheumatic fever. It is characterized by abnormal movements of the voluntary muscles, the origin of which appears to be in the central nervous system. The onset is relatively rapid; usually it is a week or two in developing, then one sees multiple purposeless movements of hands, arms, feet, legs, facial muscles and respiratory muscles. The original movement might be purposeful, such as reaching for an object, but the hand and arm undergo many accessory writhing movements before reaching the object. When the chorea is moderate or severe, the child is usually somewhat emotionally upset by this unusual movement over which he has no control. It is not uncommon for an attack to begin in a unilateral fashion, involving face, arm and leg on one side of the body, and this is labelled as hemi-chorea. Eating, writing and speech may be interfered with. The muscles tend to be hypotonic and in severe cases the arms and legs may be thrown about in a flail-like fashion.

About half of all rheumatic fever patients (young patients) have chorea at some time. Approximately three-quarters of our young chorea patients in time develop major manifestations of rheumatic fever. This would seem closely to associate the two and it is a rather satisfying relationship from a diagnostic point of view. Since chorea is rarely seen after adolescence, it is not usually helpful with the diagnosis in adults. However, an occasional adult with questionable rheumatic fever findings gives a history of childhood chorea. The presence of definite chorea associated with questionable signs and symptoms helps to establish a definite diagnosis of rheumatic fever.

Chorea and Habit Spasm

Not infrequently, habit spasm in a high-strung, nervous type of child is confused with chorea. With experience and training, it usually is possible to differentiate between them. However, occasionally difficulty arises, and for that reason the following aids to diagnosis are set down:

1. In two-thirds of the cases of chorea there is at some time a history of other rheumatic stigmata such as heart disease, joint pains, nose bleeds,

erythema marginata or fever. These are lacking in habit spasm, where the most common history is of some emotional strain.

2. The onset in chorea is relatively rapid (1 - 2 weeks) and the parents can usually give you an approximate date of the beginning. In habit spasm the onset is insidious, gradually becoming more exaggerated, and parents cannot give accurately the time of onset.

3. In chorea the whole body usually becomes involved—face, arms, legs and respiratory movements. It is not uncommon to have these choreiform movements limited to the side of the body—a hemi-chorea. In habit spasm the movements are usually limited to some particular area such as eyes, mouth, neck, etc.; rarely do they become generalized.

4. In chorea the movements are writhing. They are purposeless. A child with chorea may reach for something and that movement is purposeful, but the many accessory writhing motions he makes in putting forward his hand and arm are purposeless. In habit spasm the movements are spasmodic, short and quick, and are originally purposeful (such as adjusting the collar) but become exaggerated or used more frequently than necessary. In chorea the eyebrow movement is usually upwards, whereas in habit spasm it is a blink and the eyebrows are compressed. In chorea the respiratory muscles are often incoordinate and irregular. In habit spasm they are regular. In chorea the writhing movements may interfere with eating, writing and speech. These faculties are not interfered with in habit spasm as a rule.

5. The muscles tend to be hypotonic in chorea (fingers may be hyper-extended on the hand), and either normal or hypertonic in habit spasm.

6. Chorea usually subsides in about two months. Habit spasm may last for many months. If it is newly acquired, however, and the basis for its origin is corrected, it may disappear rapidly.

Subcutaneous Nodules

Subcutaneous nodules are found protruding through the skin over the elbows, knees, ankles, knuckles, back of the head, over the vertebrae and spinal column, and other situations. Approximately two-thirds of the patients who have any nodules at all have them showing over the elbow. Such nodules are characteristic of rheumatic infection, but when present there is almost invariably a co-existing rheumatic heart lesion. For this reason, nodules do not have much diagnostic import. It has been noticed by most observers that when nodules are present the infection is a severe one.

Recurrence of Rheumatic Fever

No feature of rheumatic fever is more striking than the tendency of the disease to recur. Perhaps, also, no more serious aspect as to prognosis exists. The history of previous rheumatic fever or rheumatic heart disease is strong evidence of the existence of active rheumatic fever in the presence of even mild signs and symptoms. In Dr. T. Duckett Jones' experience, about 70 per cent of a series of young rheumatic fever patients have recurrence of the disease within ten years of the onset, the majority within 5 years. Rothe *et al* noted 68 per cent with recurrence in their series.

Minor Manifestations

1. *Fever*: A definite elevation of the body temperature is one of the most common and most variable findings in rheumatic fever; fever alone, even in the presence of laboratory abnormalities, is insufficient to make a diagnosis of initial rheumatic fever. At the present time, fever alone (or in the presence of an extra cardiac, so-called, or functional murmur) is a common erroneous basis for a diagnosis of rheumatic fever. (N.B.—See note on fever in relation to activity.)

While fever is helpful, it may be misleading, and other features are much more important in making a diagnosis.

2. *Abdominal Pain:* An occasional accompaniment of rheumatic fever is abdominal pain. The explanation of its cause is not yet clear. Two causes of abdominal pain in rheumatic fever are pericarditis and enlargement of the liver, but the usual type of abdominal pain is not associated with either pericarditis or cardiac failure. The pain is similar to that found in an acute upper respiratory infection; is usually vague and not too acute. As a general rule, it disappears in a day or two. However, at times, it may be more severe and presents a diagnostic problem when it simulates appendicitis. The presence of other rheumatic stigmata is helpful in the differential diagnosis, but where one cannot be sure and the surgeons recommend operation, it rarely harms the patient to have the anaesthetic and operation even though rheumatic infection with heart disease is present. In any case, the dangers of withholding operation may frequently be more significant than those of performing it.

3. *Precordial Pain:* This symptom has been reported in the literature, but of late years has not been a prominent feature of the disease. It is not common in children with rheumatic fever or carditis. Even those who have had pericarditis to a marked degree do not complain much. Among adults it is found when pericarditis is present, occasionally with aortic insufficiency and not infrequently with severe enlargement of the heart. When little or no enlargement of the heart occurs, it is rarely mentioned by the patient. On direct questioning, a few admit it to be a minor complaint. One must remember, however, that mild or transient precordial pain is one of the commonest symptoms of neurocirculatory asthenia even in the presence of definite heart disease.

4. *Rashes:* While many nondescript rashes have been described in rheumatic fever, erythema marginata is the only one of diagnostic significance. It is characterized by a circinate or annular rash occurring on the arms, trunk and legs. It is usually faint with little or no elevation and has a dull purplish-red hue. If it is watched from hour to hour, it will be noticed that it is changing gradually. A very similar rash occurs in allergic conditions, particularly in children below the age when rheumatic fever is usually found. Here the circles of rash may be a little larger and the margin more raised and hive-like, and the rash redder and more palpable.

The evidence at hand suggests that erythema marginata could be classed as a diagnostic manifestation of rheumatic fever. However, the fact that it

occurs relatively infrequently and at times closely resembles an allergic rash makes further study imperative.

5. *Epistaxis*: Non-traumatic nose bleeds are common in rheumatic fever. They appear to be less severe and less frequent than a decade ago. While it is known that rheumatic fever often damages blood vessels, the exact pathology behind this symptom is not yet clear. In association with other findings, epistaxis may be of some use in making a positive diagnosis.

6. *Pulmonary Findings:* Various degrees of pulmonary change, from increased bronchial markings to complete consolidation, have been described in the rheumatic literature. Since the appearance of atypical pneumonia as a prominent clinical entity, it appears likely that this was sometimes mistaken for a rheumatic manifestation. Atypical pneumonia at times may be accompanied by joint symptoms very similar to rheumatic fever, but the sedimentation rate is lower and returns to normal much more rapidly. The only time that the diagnosis is confusing is when atypical pneumonia occurs in a known rheumatic patient. If it is realized that joint symptoms occur with atypical pneumonia, the diagnosis is usually clear.

In severe cases of rheumatic heart disease, with enlargement of the heart or with pericarditis and effusion, the bronchial breathing is often heard at the left base posteriorly and occasionally in the right base. Rhonchi and watery sounds of congestion may also be present. These, of course, are marked in the presence of rheumatic heart failure. This is the only characteristic pulmonary involvement that occurs in rheumatic fever. X-ray may show increased bronchial markings or the various degrees of cardiac failure. At post-mortem one may often find a characteristic rubbery red lung with some interstitial hyperplasia and an out-pouring of endothelial cells and fluid. These changes only occur in the presence of severe heart disease, and are therefore rarely of diagnostic value.

Approach to Diagnosis

In making a diagnosis of rheumatic fever, one usually assembles evidence with the following approach.

First, many cases present the characteristic acute polyarthritis which lasts for a few days, migrating from joint to joint. This has been described above, and when it follows a haemolytic streptococcal infection and is accompanied by a raised sedimentation rate, a definite diagnosis of rheumatic fever can be made.

If the above picture is not characteristic, then one immediately considers the heart. Here again, if the findings are typical, the diagnosis is made.

It is when there is no heart disease present and arthralgia or other symptoms are doubtful that a problem is presented. In such a case, one finds the electrocardiogram useful. Approximately a quarter of the patients with acute rheumatic fever have prolonged conduction time. Cases of syphilis and toxic myocarditis, and a few normal people with strong vagal effect, may show the same defect. These other causes are not common, so that the finding of a prolonged PR interval is very useful evidence in making a diagnosis of rheumatic fever.

If the evidence is still in doubt, one turns to the sedimentation rate. This is of most value in a negative way; that is, if the sedimentation rate is normal, it is very unlikely that you are dealing with acute rheumatic fever.

Rheumatoid arthritis may sometimes start off with joint signs and symptoms that are very similar to rheumatic fever. But usually when the disease is rheumatoid in origin, the swellings in the joints persist, while in rheumatic fever any one joint will subside within a few days or a week, with rare exceptions. Furthermore, when adequate doses of salicylates are given, the rheumatic cases respond while the rheumatoid cases are not affected or show only mild symptomatic relief. It may be necessary to observe the patient for a period before eliminating rheumatoid arthritis.

All the causes of arthritis may at times need to be considered, but particularly rheumatoid arthritis (Still's disease in childhood), meningococcal arthritis, gonococcal arthritis, *B. abortis*, and *B. melitensis*. Poliomyelitis, osteomyelitis, dermatoses, and nephritis have also to be considered at times. Tuberculosis and gout have occasionally to be borne in mind.

The various causes of heart murmurs present diagnostic problems, particularly the congenital or functional ones. These have been dealt with separately.

The most confusing condition is a mild, non-specific arthralgia which does not appear to fit into any classification. Some of the differential points between this and rheumatic fever have been given above under *Arthralgia*. Many such cases cannot be accurately diagnosed and after intensive investigation are labelled "possible rheumatic fever". In the services, approximately 10 - 20 per cent of a rheumatic series fell into this possible group.

This latter group is more common in children than in adults. A large number of children develop rheumatic heart disease without ever having any of the classical symptoms of rheumatic fever. For this reason the following non-specific complaints should arouse suspicion: unexplained fever, nosebleeds, failure to gain in weight, pallor, poor appetite, fatigue, frequent upper respiratory infections, vague aches and pains. These symptoms are not in themselves of direct diagnostic value but merely suggest the need of some investigation to rule out the possibility of rheumatic fever.

Finally, it should be pointed out that in a number of cases it is impossible to make a definite diagnosis from one examination and the patient may need to be seen on several occasions and observed for a period before a satisfactory conclusion is arrived at.

The Estimation of Active Infection in Rheumatic Fever

Having made a diagnosis of rheumatic fever or rheumatic heart disease, the next question that arises and must always be settled as conclusively as possible is whether or not the infection is active. This may be settled in the acute stages by the clinical picture described above, but when this is doubtful or when the initial stage has subsided one turns to the laboratory; the sedimentation rate is usually used to decide this question. When it is raised above normal, the patient should be treated in bed.

There are five methods in common use for judging whether the disease process in a rheumatic fever patient is active or not. These are temperature,

pulse, white blood count, electrocardiogram, and sedimentation rate. All have their place and each will be commented on.

Temperature

The temperature is usually elevated in the early stages of the disease. After that there are often minor elevations from time to time during the progress of the infection, but not as a rule over 101° F. regularly, unless some other cause for fever is present or in a particularly severe rheumatic infection. Such slight elevations are usually eliminated by the adequate administration of salicylates. This has made it necessary to observe the patient for an interval after salicylates have been stopped to see if any more flare-ups in temperature will occur. Provided other causes are ruled out, an elevated temperature is accepted as evidence of rheumatic activity. However many children are kept in bed because of a slight daily rise in temperature of 99-100° F. On investigation, no disease is found and the laboratory tests such as sedimentation rate, white blood count, etc., are normal. These children should be allowed up and permitted a normal life. It appears likely that an occasional child may run a temperature slightly above the usual range that may be entirely normal for him. It has been shown that exercise, excitement or adrenalin may sometimes raise the temperature moderately.

Pulse

The pulse rate varies with the temperature. When heart disease is present the pulse rate is frequently increased. This is particularly true when moderately severe carditis is present. It is then indicative of active infection. When, however, a very mild degree of carditis is present, or when no heart involvement is demonstrable it is common to find a pulse rate that is normal or slower than normal as the disease subsides and before W.B.C. and sedimentation rate return to normal. Because of the variability of the waking pulse rate in different individuals due to excitability, it is often wiser to place more emphasis on the sleeping pulse. When this is elevated above 80, it is apt to be associated with an active rheumatic process, but not necessarily heart disease. A persistently elevated sleeping pulse rate over 90 or 100 usually means myocardial damage.

Sedimentation Rate

The sedimentation rate and the white blood count remain abnormally elevated for longer than the other signs mentioned above and are, therefore, most useful in deciding how long a patient should be kept in bed. Some workers have found that the sedimentation rate was above normal for a greater length of time than the white blood count. Massel and Jones (3),* found that the average was about the same for both tests (two months). However, the sedimentation rate has certain advantages over the white blood count. The chief one is that its degree of alteration from the normal is greater than the white blood count. The white blood count is often just a little above the upper limit of normal, and since a 10-15 per cent error may readily occur,

*See Part I for Bibliography.

this method is not as reliable as the sedimentation rate. At present, the sedimentation rate is being used almost universally as an indication of rheumatic activity.

When this test returns to normal, it is taken as evidence that the rheumatic process has subsided. By experience it has been found that these patients may be allowed up safely after their sedimentation rates have been normal for one to three weeks, depending on the severity of their infection.

As Massel and Jones (3) point out, it should be remembered that this is not a specific test and may be elevated by an infection or by tonsillectomy. One notable exception in evaluating the sedimentation rate has been found. In heart failure, it may be normal in spite of a very active rheumatic process.

Other Signs of Active Rheumatic Heart Disease

Certain other useful signs are:

(1) Progressive increase of dyspnoea.
(2) Progressive enlargement of the heart.
(3) Progressive valve damage.

Summary

The diagnosis of rheumatic fever and rheumatic heart disease is often an awkward problem. There is a lack of unanimity among members of the medical profession on what the criteria should be. Probably the fundamental reason for this is the presence of two sets of criteria for diagnosis, one for scientific purposes, the other for practical purposes in the every-day management of cases. One set deals with the features necessary for an unequivocal diagnosis when no argument would be offered by anyone. An example would be requiring the presence of heart disease before a diagnosis of rheumatic fever is made. The other set of criteria attempts to include all cases that fall into the rheumatic fever syndrome: those that may develop rheumatic heart disease as well as those that have shown signs of carditis already. For practical purposes and in the interests of the patient, it is frequently necessary to take into account suspicious signs as well as unequivocal ones when making a diagnosis.

Everyone interested in the study of rheumatic fever uses both of these sets of criteria for diagnosis at various times. In this paper the standards suggested are meant to delineate the group of patients that may reasonably be labelled as suffering from rheumatic fever or rheumatic heart disease. Where possible, the special requirements for investigations and study have been indicated also.

The author wishes to express his appreciation to Dr. John Oille for his helpful comments in the preparation of this paper.

The Heights and Weights of a Canadian Group

E. W. McHENRY, RUTH CRAWFORD
AND LILLIAN BARBER

Department of Public Health Nutrition, School of Hygiene, University of Toronto.

IN 1943 Pedley, in an editorial in *The Journal of the Canadian Medical Association* (1), called attention to the harmfulness of obesity and to the alleged failure of nutritionists to appreciate that obesity was a health problem, perhaps more objectionable than supposed deficiencies. Pedley stated that obesity would invariably be found in a random group but offered no information as to the probable incidence in Canada. The seriousness of a health problem may depend upon its extent in the population. Published information regarding the prevalence of overweight in Canada does not appear to be available. It seemed advisable to obtain such data.

This paper reports an analysis of the heights and weights of 12,393 persons, 8,075 males and 4,318 females, all residents of Ontario. Five groups of persons are included: (1) applicants for life insurance with a large insurance company; (2) university students; (3) employees of a public utility; (4) employees of a textile factory; (5) motor drivers who had provided height and weight information in applications for driver's license. Heights and weights of the first four groups were measured during medical examinations while the subjects were wearing customary indoor clothing. Since figures for the fifth group were as submitted by the persons themselves, the data may be unreliable but they have been included because the incidence of both under- and overweight is about the same as in the insurance group. Moreover, average weights for various heights, ages and both sexes are about similar to those in other groups. As standards of weight for height, age and sex, the table of Davenport, as quoted by McLester (2), has been used. This table was derived from the Medico-Actuarial Study of 1912 (3) and is the basis of most height-weight tables now in use. An individual was classed as under- or overweight if the weight was 10 per cent less or more than the weight given in Davenport's table for the individual's height, age and sex. In the compilation of results regarding prevalence of under- or overweight, individuals have been grouped in ten-year age groups, as 20-29 inclusive and so on. It should be noted that information was not available regarding race (which may affect both height and weight), nor regarding occupation or economic status, except as indicated in the general classification of the five groups of persons. Averages may have been affected by the proportion of persons supplied in the five groups. The proportion is indicated from the number of persons in each group, which was as follows:

Group	*Males*	*Females*
Insurance	1,784	526
University	1,130	1,140
Public utility	2,803	470
Textile	409	521
Motor drivers	1,949	1,661

No claim is made that these persons constituted either a representative or a random group. Data for such subjects were used because of convenience and because we were unable to obtain information for a group which would be representative of the population. Any interpretations of the data are limited to the group used.

Occurrence of Under- and Overweight

Table I shows the number of persons in each ten-year age group and the occurrence of under- and overweight. It will be noted that the percentages of overweight are about the same for various age-groups of men, but they are least in the two youngest groups of women. Except for these two groups the occurrence of overweight is about the same for both sexes. At all ages a much greater proportion of women than of men were underweight; this may be due to the popularity of "slimming" among women. Totals for under- and overweight for each sex are shown in the table. Of the total number of persons of both sexes, 17 per cent were underweight and 16 per cent were overweight.

TABLE I

OCCURRENCE OF UNDER- AND OVERWEIGHT

Age Group	Males					Females				
	Number of Persons	Underweight		Overweight		Number of Persons	Underweight		Overweight	
		Number	Per cent	Number	Per cent		Number	Per cent	Number	Per cent
10 - 19	1157	99	9	221	19	1044	201	19	142	14
20 - 29	2745	387	14	436	16	1391	370	27	176	13
30 - 39	1930	287	15	371	19	1040	296	28	190	18
40 - 49	1181	200	17	212	18	509	162	32	96	19
50 and over	1062	231	22	210	20	334	93	28	60	18
Total	8075	1204	15	1450	18	4318	1122	26	664	15

The incidence of under- and overweight in the five source groups was examined. Three of these groups are occupational to some extent (public utility, university, and textile). Some divergences were found but the only definite one was that the three "occupational" groups contained a greater proportion of underweight persons, particularly among females.

Normal Weights

It was explained above that persons were classed as under- or overweight by comparing their weights with a height-weight table in common use. This

type of comparison is ordinary practice. The "normal" weights given in the table are actually averages of persons to whom life insurance policies had been issued around 1910-12, and for whom height, weight, and other information was collected for a medico-actuarial study (3). So far as can be ascertained, these data form the basis of most height-weight tables in use on this continent. The group of persons used for the basic data was large (221,819 men and 136,504 women) but no claim was made that it was a random sample of population; it was a select group of life insurance policy-holders in Canada and in the United States. There is no evidence as to whether the sample was representative with regard to racial origin or economic status. It is possible that average weights and heights may be different now from those found in 1912. The group used in the present study is a small one and is neither random nor representative. However, it seemed useful to calculate average heights and weights and to compare these with those reported in 1912 and subsequently used for height-weight tables.

Average Heights and Weights in Present Study

Table II shows average heights for males and females in five-year age groups. There is a widespread supposition that young people are taller now than was the case some years ago. In the present study the average heights of males was greater in the young age groups; such was not the case for females. Average heights of all persons in the present group were slightly greater than reported in 1912, but not significantly so. Separate calculations of average heights were made for the university group. No difference was found for university women but in the case of university men the average height for those 19 and under was 69.5 inches and for those 20-24 it was 69.3 inches; both figures were greater than the averages for all males in these age groups. The averages for university men were significantly greater than the male average reported in 1912.

TABLE II

AVERAGE HEIGHTS OF VARIOUS AGE GROUPS

Age Group	Average Height, Males	Average Height, Females
15 - 19	68.9 inches	64.5 inches
20 - 24	69.1	64.4
25 - 29	68.9	64.3
30 - 34	68.8	64.3
35 - 39	68.6	64.4
40 - 44	68.3	64.6
45 - 49	68.0	65.1
50 and over	67.8	64.8
Average, all ages	68.7	64.5
1912 average	68.5	64.25

Average weights were calculated for various heights in each five-year age group for both sexes. These average weights were compared with those in the Davenport table. For every height and age the correspondence was remarkably close. As an example, data for males aged 20-24 are given in

Table III. In this table the Davenport figures are shown as ranges because his figures are for each age while the averages in the present study were for five-year age groups. The close agreement found for this age group was not exceptional but was the case for all age groups in both men and women. It should be noted that weights for any height occur through a very wide range. As one example of the wide variation in weight, females 60 inches tall and aged 15-19 had weights from 84 to 163 lbs.; the average was 109 with a standard deviation of 16. The number of persons in the present study was very much smaller than the number used in the 1912 study. Despite this, and despite the wide variation in weight, average weights showed close agreement with those reported in 1912.

TABLE III

COMPARISON OF AVERAGE WEIGHTS WITH DAVENPORT WEIGHTS
MALES 20 - 24

Height	Average, Present Study	Davenport Range
61 inches	119 lb.	119-123 lb.
62	124	122-6
63	132	125-9
64	133	128-133
65	137	132-7
66	139	136-141
67	140	140-4
68	147	144-8
69	151	151-2
70	155	152-6
71	160	156-160
72	163	161-5

DISCUSSION

Of the 12,393 subjects 17 per cent were 10 per cent or more above average weight for height, age and sex. In a comprehensive review on obesity, Newburgh (4) stated that there was evidence that moderate overweight was desirable in young people but that even moderate overweight lessened the life expectancy of middle-aged persons. In the present group, 18 per cent of persons aged 40 and over were classed as overweight. This nutritional abnormality was a definite problem in this group of subjects. While the group is not representative of the Canadian population, it would be surprising if a somewhat similar prevalence would not be found in a representative sample. Popular emphasis upon overweight at present is largely from an aesthetic viewpoint. We support the contention advanced by Pedley that overweight in older persons is a nutritional abnormality caused by the consumption of too much food, that it has been generally disregarded in nutrition education, and that it needs the vigorous attention of health officials.

At the same time we feel that attention should be drawn to the undesirability from the health viewpoint of underweight in young people. In our subjects 13 per cent of those under 30 years were underweight; the proportion of underweight women was much more (24 per cent). This appears to be a reflection of fashion.

Summary

1. Among 12,393 persons in Ontario, 17 per cent were classed as underweight and 16 per cent overweight.

2. The percentage of overweight persons was less in women under 30 but otherwise was about the same for various age groups in both sexes.

3. Among persons over 40, 18 per cent were overweight.

4. Among persons under 30, 13 per cent were underweight.

5. Average heights of women were about the same in various age groups and the average for all women was slightly more than that reported in 1912.

6. Average heights for men were greatest in the younger age groups; the average for all men was slightly more than was found in 1912.

7. Average weights, calculated for height, age and sex, were closely similar to those reported in 1912.

8. The present group of subjects was not random, nor was it representative of the Canadian population. Hence, the above figures should be considered to be applicable only to the particular group.

Thanks are expressed to officials of organizations from which data were obtained. Several of these officials expressed a desire that the organizations should remain anonymous. The study was greatly facilitated by a grant from the International Health Division of the Rockefeller Foundation.

REFERENCES

1. Pedley, F. G., Canad. M. A. J., 1944, *49*: 52.
2. McLester, J. S., Nutrition and Diet in Health and Disease. Philadelphia: W. B. Saunders Co., 1943.
3. Medico-Actuarial Mortality Investigation, The Association of Life Insurance Medical Directors and the Actuarial Society of America, New York, 1912.
4. Newburgh, L. H., Arch. Int. Med., 1942, *70*: 1033.

Proposed Report on the Educational Qualifications of Public Health Laboratory Workers

THE Executive Council of the Canadian Public Health Association has given preliminary approval to the following proposed Report on the Educational Qualifications of Public Health Workers. This is the second of a series of reports of the Committee on Professional Education. This committee felt that the existing reports of the American Public Health Association on the qualifications and requirements of various types of individual engaged in public health had been prepared with such care and mature deliberation that it would be a duplication of effort to start anew in formulating similar Canadian reports. Consequently, the American Public Health Association reports have been adapted as *proposed* reports for Canadian use, with the approval of the American Public Health Association.

The Executive Council approved a system whereby the reports would be published in the Journal as proposed reports and would be open to criticism for a period of approximately eight months, after which time they would be rewritten to include any constructive criticisms received by the committee. The revised report will then be submitted to the Executive Council for final approval, following which it will be re-published in the Journal.

This series of reports will be subject to constant revision over the years in order to keep them up to date with the changing picture in pubic health.

Members wishing to offer criticism or suggestions should address them to the Chairman of the Committee on Professional Educational, Canadian Public Health Association, 150 College Street, Toronto 5.

I. The General Scope of Public Health Laboratory Work

Historically the public health laboratory has been basic to environmental sanitation and to epidemiology, and it continues to be a most important fact-finding centre of the health department. Because of the long-standing recognition of these functions, the public health laboratory may be regarded as among the most completely stablized activities of health departments. Nevertheless, both the amount and the kinds of service expected of the laboratory have recently been expanded. Advancing medical discoveries are likely still further to enlarge the volume and the content of the program. It will be conceded that in almost every area of North America more laboratory service could be used with benefit to the public health program.

Extent and Coverage of Laboratory Personnel

The field of public health laboratory service now includes at least 100 workers in professional grades, according to a recent review of official agencies only. No satisfactory estimate is available of the number of professional persons engaged in private laboratories.

As to duties performed by public health laboratory workers, there are listed herewith the functions of a public health laboratory and the duties of the workers are readily inferred.

II. The Functions of a Public Health Laboratory include

1. Bacteriologic, serologic, pathologic, chemical, and other examinations to aid in the diagnosis, control and treatment of communicable and certain non-communicable diseases.

2. Bacteriologic, serologic, pathologic, chemical, and other examinations associated with the diagnosis and control of diseases occurring among domestic and wild animals, and transmitted to man.

3. Bacteriologic, chemical, microscopic and other examinations of water, sewage, industrial wastes, shellfish.

4. Examination of milk, frozen desserts, and other foods, drugs, liquors, narcotics, etc.

5. Production or provision of diagnostic, prophylactic, and therapeutic preparations, such as sera, antitoxins, toxins, vaccines, etc.

6. Research. Research is an important function of every public health laboratory. It is essential to the development of new and better methods for the control and prevention of disease, and promotes in the staff that critical attitude toward methods and results without which an accepable standard of work cannot be maintained.

III. The Educational Background

The basic preparation for public health laboratory work should essentially be professional preparation in bacteriology, chemistry, serology and/or parasitology, and in all cases the minimum training should be a college degree, with emphasis on at least chemistry, physics, and biology.

Promotion in responsibility should be based not only on experience but on the expectation that additional academic training will be secured. The ultimate balance between formal training and practical experience will have to be adjusted within each provincial system. In general, it is to be expected that an individual will make promotional progress through the classifications given below.

Outline of Training and Experience

In view of the diverse functions of a public health laboratory, the system should be so devised than an individual as he makes promotional progress toward the grade of Director should have:

1. Training in general biology.
2. Advanced special training in one or more of the biological sciences, together with the training and the personal qualifications necessary for conducting research in one or more of them.
3. Acquaintance with the biology of disease.
4. Experience in a public health laboratory such as that described in this report.
5. Administrative experience in the various divisions of the laboratory.
6. Competence to interpret the place of the laboratory in the whole health program.

Regarding the titles of positions, it makes little difference what nomenclature is used in a particular laboratory system so long as training to the level of at least the baccalaureate degree is considered a minimum requirement. However, the term "technician" in related fields has so commonly been applied to persons who do not hold college degrees that it is desirable that the term be avoided in connection with the professional staff of public health laboratories.

Four levels have been provided in the classification of grades used in this report. Local conditions, however, may make it wise to provide a different number of grades. The exact number is immaterial so long as reasonable promotional opportunities are provided.

The unification within one system of all laboratory services relating to the protection of the public health is desirable, but at present only federal, provincial and large municipal laboratories approach organization of this character. This report deals primarily with the larger laboratory systems. It is recognized, however, that most systems of laboratory service will contain smaller laboratory units with a staff of but one or two persons in whom must be combined several of the skills herein described. It is essential to have such smaller units incorporated into larger systems, such as that for a province, which will provide uniformity of standards and suitable promotional opportunities.

It is recognized that no single pattern can apply throughout North America, and it is well known that several provinces have well-matured systems based on quite different patterns. It is not intended that these systems should be disturbed so long as they accomplish the purposes of high professional achievement. Rather it is desired to provide a broad framework for the guidance of interested persons in situations not enjoying the benefits of such established patterns.

This report should be thought of as a yardstick for a provincial or territorial system of laboratory service, rather than as a pattern for an individual laboratory. It assumes that the laboratory is a part of a well-organized health department, operating under a modern merit system, and that the laboratory, together with all other divisions, is responsible for a well integrated service, both within the department and within the community.

IV. QUALIFICATIONS FOR VARIOUS GRADES OF LABORATORY WORKERS

The specific training and experience described below are regarded as the minimum qualifications for adequate laboratory service. These qualifications are not intended to be retroactive, but to apply to the selection of new personnel as positions become available.

A. DIRECTOR

The director of a public health laboratory as defined in this report should possess those qualities of personality and character necessary to insure the honest and successful prosecution of scientific work. He should have an educational background in the biologic sciences at least equivalent to the requirements for a doctorate in biological science, public health, or medicine as prescribed by a uni-

versity belonging to the Association of American Universities or a medical school approved by the American Medical Association.

In addition he should have:

(a) Five years' postgraduate practical experience and training in a laboratory of such size that experience may be obtained in the various biological sciences applicable to health and sanitary problems. Not less than two of the five years of postgraduate training and practical experience should have been devoted to training in general and special laboratory techniques applicable to the recognition of disease in the human family and disease in animals transmissible to man, and in health and sanitary problems.

(b) At least two years' administrative experience in a properly directed public health laboratory of such size that experience in the co-ordination of various laboratory functions may be obtained.

B. Assistant Director

He should have the formal educational qualifications outlined above for the Director. In addition he should have at least three years of practical experience and training in general and special laboratory technics as provided for the Director.

C. Pathologist

(a) *Principal Pathologist.* He should have graduated from a medical school approved by the American Medical Association, and should have postgraduate training and experience equivalent to that prescribed for certification by the Royal College of Physicians and Surgeons. Essentially this requirement is for five years of special training and experience after graduation from medical school.

(b) *Associate Pathologist.* He should have graduated from a medical school approved by the American Medical Association, and should have had not less than one year devoted to practical experience in the study of general and special human pathology and related medical subjects.

D. Bacteriologist

(a) *Principal Bacteriologist (or Serologist).* He should have an educational background in biological science equivalent to the requirements for a doctorate prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or immunology, and at least two years' practical experience in a public health laboratory.

(b) *Associate Bacteriologist (or Serologist).* He should have an educational background equivalent to a Master of Science degree prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or immunology, and at least one year of practical laboratory experience.

(c) *Senior Assistant Bacteriologist (or Serologist).* He should have an educational background equivalent to a Master's degree prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or immunology.

(d) *Junior Assistant Bacteriologist (or Serologist)*. He should have an educational background equivalent to a Bachelor's degree prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or related sciences.

E. CHEMIST

(a) *Principal Chemist.* He should have an educational background in biological sciences equivalent to the requirements for a doctorate prescribed by a university belonging to the Association of American Universities, with a major in chemistry, or a degree in chemical engineering or sanitary engineering, and at least two years' practical experience in a public health laboratory.

(b) *Associate Chemist.* He should have an educational background equivalent to a Master of Science degree prescribed by a university belonging to the Association of American Universities, with a major in chemistry, or a degree in chemical engineering or sanitary engineering, and at least one year of practical laboratory experience.

(c) *Senior Assistant Chemist.* He should have an educational background equivalent to the requirements for a Master's degree prescribed by a university belonging to the Association of American Universities, with a major in chemistry, or a degree in chemical engineering or sanitary engineering.

(d) *Junior Assistant Chemist.* He should have an educational background equivalent to a Bachelor's degree prescribed by a university belonging to the Association of American Universities, with a major in chemistry, or a degree in chemical engineering or sanitary engineering.

F. PARASITOLOGY

(a) *Principal Parasitologist.* He should have an educational background in the biological sciences equivalent to the requirement for a doctorate prescribed by a university belonging to the Association of American Universities, with a major in parasitology and at least two years' practical experience in a public health laboratory.

(b) *Associate Parasitologist.* He should have an educational background equivalent to a Master of Science degree prescribed by a university belonging to the Association of American Universities, with a major in parasitology and at least one year of practical laboratory experience.

(c) *Senior Assistant Parasitologist.* He should have an educational background equivalent to the requirements for a Master's degree prescribed by a university belonging to the Association of American Universities, with a major in parasitology.

(d) *Junior Assistant Parasitologist.* He should have an educational background equivalent to a Bachelor's degree prescribed by a university belonging to the Association of American Universities, with a major in parasitology.

TABULAR RESUME OF TRAINING AND EXPERIENCE SUGGESTED FOR VARIOUS GRADES IN THIS REPORT

Position	*Essential Degrees*	*Major Academic Emphasis*	*Years of Prior Experience Essential*
Director	Doctorate in science, public health or medicine	Medical and biological sciences	5, with minimum of 2 years in a public health laboratory
Assistant Director	Doctorate in science, public health or medicine	Medical and biological sciences	3
Principal Pathologist	M.D.	Medicine and pathology	5
Associate Pathologist	M.D.	Medicine and pathology	1
Principal Bacteriologist	Doctorate in science, public health or medicine	Bacteriology	2
Principal Serologist		Serology	2
Principal Chemist		Chemistry	2
Principal Parasitologist		Parasitology	2
Associate Bacteriologist	Master's degree	Bacteriology	1
Associate Serologist		Serology	1
Associate Chemist		Chemistry	1
Associate Parasitologist		Parasitology	1
Senior Asst. Bacteriologist	Master's degree	Bacteriology	..
Senior Asst. Serologist		Serology	..
Senior Asst. Chemist		Chemistry	..
Senior Asst. Parasitologist		Parasitology	..
Junior Asst. Bacteriologist	Bachelor's degree	Bacteriology	..
Junior Asst. Serologist		Serology	..
Junior Asst. Chemist		Chemistry	..
Junior Asst. Parasitologist		Parasitology	..

Canadian Journal of Public Health

THE FOURTH INTERNATIONAL CANCER RESEARCH CONGRESS

DURING the first week of September, more than five hundred scientists representing forty-four countries met in St. Louis, Mo., for the Fourth International Cancer Research Congress. This is striking evidence of the attention which cancer today is receiving in the scientific world; at the previous conference, held in Atlantic City, N.J., in 1939, there was only a small group of scientists comprising those who were then engaged in cancer research. The congress was sponsored by the *Union Internationale contre le Cancer* and the American Association for Cancer Research, Inc. The president of the congress was Dr. E. V. Cowdry, who is internationally known in cancer research. Dr. J. Godart, president of the *Union Internationale,* and Dr. J. J. Bittner, president of the American Association, shared with Dr. Cowdry the direction of the congress.

The general and special sessions included presentations on the following topics: general aspects of cancer research, cancer surgery, radiation therapy of cancer, and the etiology of cancer. The relation of chemistry to cancer, hormones, nuclear physics, and the various aspects of the biology of cancer were the subjects of numerous papers. A feature of the meeting was the exhibits which supplemented the presentations by various authors at the general and special sessions, including the results of laboratory and clinical research, the materials and equipment used in cancer research, and the work of various organizations promoting the study of cancer. More than fifty films were presented, including several which have been used effectively in other countries in popular education.

The papers on fundamental studies relating to the biology of cancer included the whole subject of growth of normal and tumour tissues, and indicated the large number of investigators who are engaged in these essential studies, without which the understanding of cancer will never be attained. Such studies require years of patient work, critically interpreted. It is the extent of these studies which gives encouragement to those who seek the solution of the cancer problem, rather than the possible dramatic results which are often reported following the use of some chemotherapeutic agent, or the promise of some spectacular finding based upon a few observations.

The relationship of viruses to tumour growths was discussed in papers by workers particularly concerned with virus diseases, and was considered also by those whose special fields of interest are chemotherapy and the action of hormones. It is well known that tumours, both benign and malignant, occurring in birds and in certain animals may be transmitted by filtrates of the tumour tissues. In man, however, a virus has not been isolated from any malignant growth. The rabbit papilloma virus of Shope produces a proliferative skin disease in rabbits which is sometimes followed by the development of squamous-cell carcinoma. Although in the early stages of infection papilloma virus can be readily transmitted from one rabbit to another, after development of the neoplastic stage tumours cannot be readily transplanted. One of the interesting reports of work in this field was the successful transmission using newborn rabbits. Other important papers indicated the high specificity of viruses for certain species and for certain tissues. Intensive research is being done in the virus field. Difficulties of interpretation arise, however, due to the frequent contamination of tumour transplants with extraneous viruses, for it is known that viruses may grow well in transplanted tumours. Further, the presence of contaminating viruses may cause no change in the tumour or may cause a regression of the growth.

The many papers in the field of chemotherapy included encouraging findings following the administration of fractions obtained from the growth of bacteria and other organisms. Using extracts of *Trypanosoma cruzi,* two Russian scientists seventeen years ago recorded interesting results in tumour mice. This work has been continued in Russia and it was reported that the extract had been used in a few clinical cases. Because of these encouraging results, studies were started in 1947 under the auspices of the National Cancer Institute of the U.S. Public Health Service and independently by workers in New York City. The results of the American investigators indicated that the substances obtained should receive extended study and later, if warranted, a clinical trial. In the chemotherapeutic work to date, the approach has been empirical. If the substance is found to be effective in causing a tumour to retrogress, the research worker in chemistry then proceeds systematically to prepare compounds of similar nature, modifying these in various ways and observing the results in laboratory animals in which tumour growths are present.

Physiologists and biochemists concerned with the role of hormones have indicated that these agents may have many roles in the development of tumours, sometimes initiating development and sometimes even exerting a controlling effect on malignant growths. In this field, French workers reported the results of an interesting study on carcinogenic substances. They claimed that carcinogenic activity is related to the existence in the molecule of a particular region of high electronic concentration. This theory, if substantiated, would permit of the synthesis of a variety of compounds with varying carcinogenic activity.

Those working in radium therapy have extended greatly the knowledge and the effectiveness of this form of therapy. One of the most promising fields in the attack on cancer is the use of radio isotopes and the application of the knowledge of nuclear physics. The use of isotopic tracers enables a direct approach to be made to many important problems in intermediary metabolism. By this means

one is enabled to follow the path of a given atomic grouping during its utilization by the organism—a feat which in many cases would be impossible without the isotope, since the particular grouping would be lost in the general "pool" of metabolites. Thus, phosphorus administered either in inorganic form or in combination in a complex organic molecule becomes indistinguishable from the large amounts of phosphorus already present in the organism. In principle, these difficulties disappear when it becomes possible to label the phosphorus in any particular compound with its radioactive isotope. Such a method can be extended to any element of biological interest and with the prospect, ultimately, of large amounts of radioactive isotopes of many of these elements from the uranium chain-reacting pile, there is widespread interest in this powerful technique.

The papers read on this subject before a section of the congress illustrate the versatility of the method, and its great potential value for the study of cancer-cell metabolism. Interesting observations on the distribution of radioactive zinc and strontium demonstrated the ease with which it is possible to estimate these elements, normally present only in traces in the animal body. Other studies on the uptake of radio-iodine by thyroid tissue, both normal and malignant, suggested that in some forms of cancer internal radiation by the radioactive element concentrated in the malignant cells might prove to be of great value as a therapeutic measure.

The highlight of the congress was the announcement of the releasing of supplies of isotopes to scientists in all countries whose laboratories are equipped to use the materials effectively. These isotopes are produced in the United States Government's radium stock-pile at Oak Ridge, Tennessee. At present they number thirty, ranging from antimony to zinc, and all that are susceptible of use in scientific research as tracers are to be made available. In his message to the congress announcing the Government's action in making these available, President Truman said: "The sharing by all and among all nations of both the means and the results of cancer research will reduce the loss of life and human suffering from disease throughout the world." The announcement was received with enthusiastic approval, and scientists from many countries spoke of the great significance of this action, voicing their conviction that it would speed the attack on cancer.

To Canadians it was gratifying that Canada occupies an advanced place in the study of nuclear physics and the provision of fission products. At Chalk River, near Ottawa, Canada has a great centre of research in this highly important field of study; and in co-operation with the National Research Council, the National Cancer Institute of Canada and the provincial cancer research bodies wlil have every facility extended to them.

A significant step towards the formation of a new world-wide organization to combat cancer was taken during the meeting, laying a broad framework in which every country in the world would participate and providing an annual meeting which would permit of a world exchange of information.

The Fourth International Cancer Research Congress revealed the intensive and far-reaching effort which is being made by scientists in many countries to unravel the problem of cancer. The progress of basic studies gives encouragement. Although there was no startling discovery and only preliminary investi-

gations in many fields, including the application of the newer knowledge of physics, were reported, there was everywhere evident a keen desire to press forward. The results of the congress are well summarized in the words of Dr. G. W. Larimore, Educational Director of the American Cancer Society:

"What the researchers are doing is to build a wall. Each seemingly unimportant discovery is another brick in the wall, and in one of these obscure discoveries may ultimately be found the final answer, or a clue to it."

PUBLIC HEALTH AND THE PRACTISING PHYSICIAN

IN his presidential address at the joint session of the Canadian Public Health Association and the Conference of State and Provincial Health Authorities of North America (page 411 of this issue), Dr. Walter L. Bierring, State Health Commissioner of Iowa, makes a plea for a closer relationship between public health and the practising physician. Lightly touching on some of the past failings of both, Dr. Bierring outlines succinctly the area common to both branches of medicine and shows how that area should increase in the future to the mutual advantage of public health, medicine, and the state. Instead of diverging, public health and the practising physician must merge so as more adequately to fulfill the single function of both—to reduce and relieve the burden of sickness and untimely death that still afflicts human life. While public health deals primarily with the mass, it must always remember that the mass is a collection of individuals through each of whom it must exercise its function. While the practising physician deals primarily with the individual, his responsibilty to the family, the community, and the state can never be disregarded. Any division between public health and medicine is, to say the least, unfortunate and neither will achieve any semblance of completeness until that division is eliminated—when one becomes the accepted complement and full co-worker of the other. Indeed when the practising physician becomes the public health officer of the family, public health will have achieved its goal; its function thereafter will be largely that of a co-ordinator. As Dr. Bierring aptly points out, the greatest impediment to this common goal is the present-day trend to specialization by which highly qualified physicians are withdrawn from the field of general practice. "There is great danger," he says, "that this service (general practice) will be taken over by less competent and less adequately prepared practitioners." The trend poses an important problem facing the medical profession and all those agencies concerned with public health. With the passing of the soap-box role of public health with all its fantastic claims which have fallen far short of realization, we should witness, too, the passing of the physician who has a bottle of medicine for every ailment. A better era is in the offing. "The preventive aspects of disease," says Dr. Bierring, "should offer to the practising physician an opportunity for useful service equal to that of diagnosis and treatment. Thus in these many fields of preventive medicine the public health administrator and the practising physician can meet on common ground, and by sustained and organized effort attain more readily the ultimate goal of optimum health for the individual and the community."

SANITARY INSPECTION

SANITATION IN RURAL SCHOOLS

STANLEY J. SHARP, C.S.I. (C.)
St. Catharines-Lincoln Health Unit, Ontario

LINCOLN, situated in the Niagara Peninsula, was one of the first counties in Ontario to inaugurate a county-wide health service. For many years the city of St. Catharines had been provided with public health services, but the county was served only with part-time medical officers, a part-time sanitary inspector, and two or three school nurses. In August 1945 the St. Catharines-Lincoln Health Unit was formed. For administrative purposes the county was divided into three parts: St. Catharines, the area east of St. Catharines, and the area west of St. Catharines. Each area has a complete staff, including medical officer, public health nurses, and sanitary inspector.

Survey of Schools

This is a sanitary survey of the schools inspected through the unit serving the Western part of the county during the year 1946. Geographically this area is divided into two distinctive parts, the area below and the area above the Niagara escarpment. Below the escarpment, where a narrow strip of land stretches out to the southern shores of Lake Ontario, there is a very fertile fruit-growing country, heavily populated and very prosperous. In this relatively small area there are 1,072 public school pupils and 8 modern, well-equipped school houses. Above the escarpment there is a very large, sparsely populated farming area. Here there are 940 public school pupils accommodated in 33 small schools, most of which are poorly equipped and very old (some were constructed as early as 1859).

Generally the roads throughout this area are very good, but during the winter and spring months some of the secondary roads leading to remote school-houses become very muddy and hazardous for driving. This is especially true in the southerly part of the county.

During the past year most of the schools in the area above the escarpment have been formed into union areas. One school board consisting of five members is provided for each township. In those parts of the county where one-room school-houses predominate, the union school boards are operating successfully; but in thickly populated areas where larger schools are found, the people prefer a single school board for each school section.

During 1946 at least two thorough sanitary inspections of each school were made by the Sanitary Inspector. Frequent visits were made at schools where unsanitary conditions required attention.

Although water is a prime necessity of life, not only as an article of diet, but also for the proper cleanliness of person and clothing, it had become contaminated at many of the small schools throughout this area. With the exception of four schools using municipal water supplies, each school has its private well or cistern. During the early months of 1946, when the Health Unit commenced its inspection of schools, the rain-water cisterns and dug wells were found to be in a very poor condition. Pipe lines from the roofs were broken and filled with dead leaves and sticks, the tops of many wells were uncovered, drip troughs were not provided, and the inner walls were broken and seepage from outdoor privies and septic toilets was entering the walls.

With the co-operation of the school boards and under the supervision of the Health Unit, the wells were cleaned and repaired. It was suggested that all rain-water cisterns should be pumped empty and cleaned each summer. The inner walls should be checked for cracks and whitewashed with slake lime. Waterproof tops were constructed, drip troughs were provided, all sewage was drained away from the well, and all pipe lines leading from the roofs to the wells were repaired.

Most of the rain-water cisterns showed the presence of *B. coli* at some period during the year, especially after the summer holidays when wells lay unused for two months. As the water in these cisterns was gathered from the roofs of the schools, the contamination

WATER SUPPLY

SCHOOL WATER SAMPLES, 1946

TYPE OF WATER SUPPLY	Source TOTAL	Bacterial Tests (*B. coli*) A.	B.	C.	D.
Drilled Well — Pump	12	29	1	3	6
Drilled Well—Pressure	6	17	–	–	2
Dug Well—Pump	2	4	–	–	1
Municipal Water Supply	4	19	1	–	–
Rain Water Cistern—Pump	17	38	5	2	14
TOTAL	41	107	7	5	23

was probably due to bird droppings and in only a few instances could it possibly be traced to human faeces.

Many drilled wells were constructed in creviced limestone formation which is found throughout this area. Cracks and crevices in limestone formations act similar to pipe lines and therefore polluting matter entering such crevices will be conveyed through them with little or no purification. In some instances where the source of pollution was not definitely established it probably came from considerable distance. In some of the deep wells sulphur, iron, and other inorganic compounds have imparted tastes and odours in the water, rendering it unpalatable to the pupils. Dirty water was reported at many schools where drilled wells were used. In most cases the basic trouble was caused by either broken and rusted casings or the point of draw being too low.

Where continual testing by the Health Unit showed a contaminated water supply, a chlorine outfit was obtained for the school. These outfits were purchased at cost price from the Provincial Laboratory, Toronto. The outfits are very simple to operate and instructions are left with the teacher who chlorinates the water for the pupils.

It was the common practice of the teachers to allow the children to drink and wash at the pump or well. This procedure was discouraged and it was requested that an adequate supply of clean and pure water be provided in the classroom. Earthenware covered containers with a tap at the bottom were obtained for each classroom. Paper cups were supplied for each student in place of the community drinking cup. As paper cups were a novelty to the students, it was suggested that each child be given one cup in the morning and one in the afternoon. The cups could be placed upside down on a clean piece of paper upon each desk top.

In schools where water pressure systems were provided it was suggested that angle-type fountains be installed.

Washing Facilities

In most of the schools, except those where water pressure systems were provided, washing facilities were non-existent a year and a half ago. One small dirty pan was usually provided for washing the hands, the face, blackboards, desk tops, and many other classroom items. Usually at the back of the classroom a very soiled cotton towel hung from a bent nail.

This unsanitary picture has been changed through the continual efforts of the Health Unit. In most schools where sinks were not installed two hand basins and one slop pail have been provided for the convenience of the pupils. An ample supply of clean water (separate from that used for drinking purposes), liquid soap, paper towels, and a receptacle for the used towels are now found in each classroom. Most of the schools have been provided recently with tables which are to be used for the washing facilities. The pupils have been encouraged to bring paint, linoleum and trimmings from their homes to decorate the wash tables. Monitors have been elected in the classrooms to supervise the washing facilities and to check cleanliness of each pupil prior to lunchtime.

Sewage Disposal

In this area there are 27 schools equipped with septic toilets, 3 with outdoor privies,

and 10 with water flush systems, while 1 is connected to a municipal sewage system.

If septic toilets are properly installed and maintained, they have a recognized place in the field of school sanitation, and especially so for the smaller places where water is not obtainable. During the past year many new installations have been made and within a year it is expected that all outdoor privies will be replaced by septic toilets. As most of the schools in the area have a very restricted water supply and few of the one-room schools are heated over the week-end, it would not seem feasible to recommend water flush toilets.

It has been the experience of the St. Catharines-Lincoln Health Unit that the troubles arising from septic toilet installations were in the schools where the attendance was comparatively large. In the smaller schools the toilets have given comparatively little trouble. One difficulty was the fact that many of these toilets were installed in small cubicles at the rear of the classrooms and as a result odours were getting into the school proper. It was found, in some cases, that a very inadequate number of tiles were laid beyond the tank. In some cases the tanks were placed close to the surface of the ground and there was resultant freezing. In many schools there was little supervision of these installations and many articles were dumped into the toilets such as paper, clothing, orange peel, etc., which gave trouble. All this seems to emphasize the necessity for careful supervision during the installation and also supervision over the operations of the systems.

During the past year water-flush septic-tank disposal systems were installed at two school-houses where water pressure supplies had been provided. Plans for these new installations were obtained from the Division of Sanitary Engineering, Provincial Department of Health, Toronto.

Lighting

All the schools in this area except 4 are equipped with electric lighting. Of the remaining 4 schools, 3 are provided with gas and 1 has no artificial illumination.

The amount of window surface admitting daylight should not be less than one-fifth to one-quarter of the floor space. This amount of transparent glass is provided in the small rural schools because most of them were built at a time when artificial lighting was not considered. But even with the recommended amount of window space many of the classrooms are dark. It has been recommended that the walls and ceilings be painted in a light colour, dark woodwork should be lightened, and dark desk tops should be refinished in natural wood. The amount of light lost by absorption by the blackboard can be reduced greatly by using a small blackboard area and also by covering the blackboard with adjustable curtains or blinds when not in use. The use of sight-saving chalk has been encouraged.

The Health Unit has suggested board lighting and in most of the classrooms this has been installed. Some of the classrooms have been provided with fluorescent lighting; it is hoped that before long this type of illumination will be provided in all schools.

Translucent shades have been provided for all classroom windows. As the best light comes from above, it has been suggested that the shades be adjustable, either by the use of two rollers both at the middle of the window, or one at the middle and one at the bottom, or a single roller that can be adjusted to any position.

In many classrooms where the lighting is poor, window decorations have been discouraged. A painted window may be attractive, but it certainly decreases the amount of natural light entering the classroom.

Heating and Ventilation

Heating and ventilation of the school-room are of paramount importance and the two go hand in hand. The classrooms, in most of the small country schools, are usually poorly ventilated and unevenly heated. The children sitting near the stoves are uncomfortably hot while those in remote positions are cold.

In most of the rural schools box-stoves are used for heating purposes. It has been suggested that metal baffles be placed around the stoves to provide a better circulation of the warm air. In many rooms air vents are placed beneath the stove to cause more circulation of the warm air from behind the baffle. During the winter months a pail of water is usually kept on top of the stove to provide moisture in the air.

It was noted that the teachers were not using the windows for ventilation. In the small school-houses the teachers were instructed to use at least two of the top windows

for this purpose. Where bottom windows were opened, it was suggested that glass deflectors should be installed to prevent unnecessary draughts upon the pupils. Even during cold weather the windows should be opened periodically and the classroom thoroughly ventilated.

Fly Control

Due to the close proximity of barnyards, many school-houses have been menaced by flies during the warm months of the year. As it would be impossible to clean up all the barnyards in the area to a degree where flies would not breed, it has been suggested that screens be provided for the windows and doors of the classrooms. The rooms should be sprayed with a good type of fly spray after school hours each day. It has been noticed that children's lunches are a great attraction to the flies and it is the Unit's wish that lunch cupboards be installed in the schools.

General

All sanitary recommendations have been dealt with by the following methods:

1. Annual School Report

One copy of this report is sent to the school board and one copy is sent to the Provincial Department of Health, Toronto.

2. Letters or Personal Visits to the School Board

This has been found the most satisfactory approach.

3. Attending School Board Meetings

When an invitation is extended to the sanitary inspector to attend the school board meeting, this manner of approach can be very successful.

4. Tour of Schools with the School Board

It was found that school boards wanted to cover too many schools in too short a period of time.

Summary

We have attempted to summarize our first year's experiences of inspecting schools in a rural area. It is obvious that it is impossible to correct all the defects found in the same period of time, but we do feel that a beginning has been made in the right direction.

It is the objective of the St. Catharines-Lincoln Health Unit to work towards a consolidated school for each township. This would eliminate all the small, poorly equipped school-houses, and would eventually be more economical.

The school-teachers have been very co-operative and they have tried to help the Health Unit in as many ways as they are able. So many sanitary conditions in the schools are the direct responsibility of the school-teacher that it is felt that by making them health-conscious it has broadened the Health Unit's path to success. This is a long-range program in public health and one that cannot successfully be realized by the Health Unit alone. It is a community enterprise and requires the help of everyone.

VITAL STATISTICS

THIRD MEETING OF THE VITAL STATISTIC COUNCIL OF CANADA

THE third meeting of the Vital Statistics Council of Canada was held at Ottawa on May 26, 27, and 28, 1947. British Columbia was the only province not represented and this regrettable circumstance was due to the fact that Mr. J. D. B. Scott was taken suddenly seriously ill while en route to Ottawa. As Mr. Scott has always taken a very prominent part in the discussions of previous meetings, his enforced absence was keenly felt by all present.

Dr. Halbert L. Dunn, Chief of the National Office of Vital Statistics, Washington, D.C., brought greetings from the Council of Vital Records and Vital Statistics of the United States. He said in part: "I appreciate very much these opportunities to meet with you and discuss joint problems. No longer do I feel myself to be a visitor from a foreign country but rather a colleague and one of you." Dr. Dunn's mature thinking on registration practices always proves of extreme value to the success of the discussions.

One of the most important items discussed was the report on the advisability of drafting a Model Marriage Act for consideration by the Provincial Governments with a view to securing uniform essential requirements in provincial Marriage Acts. This report was presented by Miss L. E. Stewart, Acting Recorder of Vital Statistics, Winnipeg, on behalf of her committee.[1] Mr. R. J. Cudney, Deputy Provincial Secretary, Province of Ontario, was present as Legal Adviser. Miss Stewart did a great deal of ground-work, having sorted and arranged, under common headings or subject matter, the provisions of the various Acts and submitted a copy to each provincial official, the Provincial Secretary for the Province of Ontario, and to the Vital Statistics Branch of the Bureau, for study and submittal of suggestions. A long discussion ensued and the present committee, enlarged by the appointment of Mr. Cudney, was instructed to continue its work with the intention of submitting a proposed draft Model Marriage Act to the next Council meeting with the intention that when finally passed by the Council it should be given to the Commissioners on Uniformity of Laws for Canada to be put into force as a Model Marriage Act.

Dr. F. S. Burke, Director of Blindness Control, Department of National Health and Welfare, presented the report of the proceedings of the International Committee of the World Health Organization for the preparation of the Sixth Decennial Revision of the International List of Diseases, Injuries and Causes of Death, in joint session with the United States Committee on Joint Causes of Death, of which Dr. Burke is a member, held in Ottawa, March 10-21, 1947. The Council endorsed the principle of the international statistical classification as proposed by the Interim Commission of the World Health Organization as an international medium for the classification of morbidity and mortality data. The Council also endorsed the action of the Canadian members of the United States Committee[2] in supporting the publication of the proposed list in English and French by the World Health Organization an an international document. It was recommended that this decision be incorporated as one of the Canadian proposals to be made to the Interim Commission of the World Health Organization.

The standard minimum proof required before a Delayed Registration of Birth shall be issued was discussed and it was decided that copies of these standard minimum requirements should be forwarded to such agencies as have been questioning the evidence upon which delayed registrations are effected.

The question of uniformity in the Vital Statistics Acts of the provinces was considered and the general opinion of the members was

[1] *Miss L. E. Stewart (Chairman), Mr. W. T. Crockett (P.E.I.), and Mr. A. Packford (Alta.)*

[2] *Dr. J. C. Meakins (McGill); Dr. J. Wyllie (Queen's); Dr. F. S. Burke; Mr. J. T. Marshall (Chairman), Miss O'Brien (Technical Adviser).*

that this objective could be achieved only through the medium of joint discussions between the officers of the Provinces responsible for drafting the legislation and the Council members. It was finally decided that the Minister of Trade and Commerce should be requested to call a joint conference of the Council and the Legislative Councils of the provinces in the fall of 1947 for the purpose of studying the provisions of a uniform Vital Statistics Act for the nine provinces.

Mr. H. G. Page lead the discussion on technicalities in connection with the National Register of Vital Records. Inherent factors involved in the actual working of the Index in connection with Family Allowance verification, death clearance, the procedure for posting to birth and marriage indexes and related inter-provincial transfer of events, and the study of the working mechanics of the whole system were considered in minute detail.

Among other matters under discussion were the problems arising incidental to the introduction of the laminated birth certificate card, and difficulties encountered in connection with searches and transfers.

On Tuesday evening the Provincial Registrars were hosts at a dinner held at the Chateau Laurier, in honour of Mr. J. T. Marshall, who is relinquishing immediate direction of the Division which deals with public health statistics after thirty-odd years of active participation in all phases of the work. Mr. Marshall has been appointed Assistant Dominion Statistician, in charge of the administrative work of the Dominion Bureau of Statistics. A presentation of a pen and pencil set was made to Mr. Marshall in appreciation of his contribution, guidance and leadership in vital statistics.

BOOKS

Cancer Mortality in Canada and the Provinces, 1921-1944. *Vital Statistics Analytical Report No. 3, Dominion Bureau of Statistics, Department of Trade and Commerce, Ottawa, 1947.*

THIS Report from the Dominion Bureau of Statistics has been prepared under the direction of Dr. Mary A. Ross, Field Research Assistant, and Mr. R. B. Crozier, Statistician, of the Vital Statistics Branch, and is published with the collaboration of the Department of National Health and Welfare. It shows the mortality attributed to cancer in Canada, 1921-1944, by province, number and rate. Further analyses by age, sex and site and the adjustment of the rates so as to remove the effect of changing age constitutions of the population are confined to the period 1931-1944. According to the foot-note on page 3, "It is not possible to standardize the 1921-30 rates, as no estimates of population by age and sex are available for this period." This is a frank admission of a deficiency which reflects, simply and factually, the tremendous pressure under which the staff of the Dominion Bureau of Statistics have been working; only when personnel adequate in quantity and quality become available to the Bureau can such a fundamental deficiency be corrected. While the population data for 1921 are available and the death rates for that year might have been adjusted to the 1931 population so as to allow a limited comparison, controlled for age, with the later period, it is probably preferable to wait until the final estimates of the inter-censal years are produced, thus permitting standardization for the whole period.

Though, on the basis of the 1931-33 and 1942-44 averages, the crude rate has increased by 23.6 per cent in that interval, the standardized rate has advanced by only 5.6 per cent; as the authors properly explain and emphasize, by far the larger part of the recorded increase is thus shown to be due entirely to one factor—the aging of the Canadian population, a larger part of the population now being in the older age groups which supply the larger part of the cancer deaths. Perhaps more emphasis might be given to the statement that ". . . . . improved diagnosis has resulted in a more complete reporting of cancer deaths, but the effect of this factor is not measurable"; this fact must be kept to the fore in any consideration of changing cancer mortality. "Deaths attributable to cancer", necessarily the only established quantity available for statistical analysis, is not synonymous with "deaths due to cancer" or even "deaths with cancer"; the difference is a constantly changing one and varies not only with time but with age and with site. Tables showing

the percentage distribution of cancer deaths by site and age, Canada, 1941-43, present clearly vital information which is far too often neglected; it is salutary to be reminded that 11.1 per cent of all recorded cancer deaths are in the age group of 80 and over, and 25.6 in the age group of 70-79, so that over one-third of the cancer mortality problem lies in what might be considered old age when man must die. This fact shows how ridiculous and misleading is the comparison so often made in both the lay and professional press of the number of cancer deaths with the number killed or otherwise dying in the Services. The report brings out clearly the very pertinent and also too often neglected fact that cancer of the digestive tract and peritoneum is the most common for both men and women, constituting over 50 per cent of all deaths classified under cancer in the experience. The breast and uterus contributed 18.8 per cent and 15.6 per cent respectively of the female cancer deaths, the sex selective factor of these two sites accounting for the slightly higher total cancer mortality in the female than in the male. Cancer of the rectum and anus contributed 4 and 6 per cent respectively in females and males.

Being a purely statistical compilation and analysis, the report does not lend itself to any complete review. Suffice it to say that it is a most timely publication which should be read and carefully examined by all those interested in cancer, particularly those associated with any part of the various cancer projects including the "research" personnel and, too, the publicity agents who play such a regrettably large part in all promotion plans of today, medical and otherwise, and who, through careless or calculated omission of essential features which should not be omitted, present for public impression sensational, distorted and misleading pictures of the truth. The Dominion Bureau is to be congratulated on bringing these facts forward at this time, on the straight-forward analysis, and the clarity and brevity of its presentation.

The Sanitary Inspector's Handbook. *By Henry H. Clay, F.R.San.I., F.I.S.E. 6th ed., revised and enlarged, 1947. London: H. K. Lewis & Co. Ltd. 545 pages. 22s net.*

So much has been written in praise of previous editions of this book that it is difficult to find new terms of appreciation for the revised and enlarged sixth edition.

Major Clay has followed his original method and summarised the applicable law at the beginning of each chapter, illustrating the technical details in a most admirable manner. Indeed, one uses the word "illustrate" advisedly, as the book contains ninety-nine drawings and diagrams, many of them from originals by the author, which the student sanitarian may well emulate and the graduate envy.

While the book is primarily written for the English sanitarian, it contains much profitable material for his Canadian colleague. Indeed, there is something for everyone. The student will find basic technical matters clearly expounded and the senior worker and administrator much fundamental public health law, invaluable as collateral reading when preparing or studying policy.

The chapters on housing and the hygiene of building are well done and the author has been at considerable effort to bring the section on disinfestation up to date, with special reference to DDT.

It is a slight surprise not to find the orthotolidin test for chlorine included and at least a passing reference to ANTU. But these are small things when considered in the light of the general excellence of the work.

One may prophesy that "Clay" will remain the outstanding work of its kind for some considerable time to come.

A. S. O'Hara

An Appraisal Method for Measuring the Quality of Housing: A Yardstick for Health Officers, Housing Officials and Planners. Part II. Appraisal of Dwelling Conditions. Volume A, Survey Director's Manual; Volume B, Field Procedures; Volume C, Office Procedures. *New York: The American Public Health Association, 1946. $5.00.*

In 1937 the American Public Health Association established a Committee on the Hygiene of Housing at the request of the Housing Commission of the Health Organization of the League of Nations. This Committee, under the chairmanship of Professor C.-E. A. Winslow, undertook a long-range program involving three major tasks: (1) measuring the quality of existing housing, (2) establishing standards for housing of the future, and (3) strengthening and clarifying housing regulations and their enforcement.

During the war years active participation in the solution of the various special housing problems which confronted the United States delayed the work directed towards these primary objectives. The material under review was prepared by the Subcommittee on Appraisal of Residential Areas, under the chairmanship of Dr. Rollo H. Britten, and is the happy result of postwar activity guided by prewar deliberation. The four volumes at present available are part of a series of six on housing appraisal to be issued by this Subcommittee and designed to provide a yardstick for measuring the quality of housing.

Appraisal Method for Housing

Part 1. Nature and Uses of the Method
Part 2. Appraisal of Dwelling Conditions.
Volume A. Survey Director's Manual.
Volume B. Field Procedures.
Volume C. Office Procedures.
Part 3. Appraisal of Neighbourhood Environment. (In preparation.)
Extra. Manual of Survey Procedures. 1 volume. (In preparation.)

Parts 1 and 2 were prepared by Dr. Allan A. Twitchell, Part 3 by Drs. Anatole A. Solow and Twitchell.

The first two parts, incorporating four volumes, provide full details for the application of the recommended appraisal methods by health officers, housing officials, town planners and others interested in this aspect of our existing civilization. The titles of the volumes indicate the scope of this outline.

The points covered in the appraisal method recommended and the procedures and standards of measurement have been determined after extensive consultation with experts in every specialty involved. The final recommendations were fixed only after extensive field trials in a number of different communities. This appraisal method has already been widely adopted in its present form. The U.S. Public Health Service is promoting its use throughout the United States.

It is safe to say that no such detailed standardization for the appraisal of housing has ever been available at any time in the past. Indeed, it is doubtful if such precise quantitation of any complex environmental factor has ever before been attempted. The American Public Health Association and its authors, Professor Winslow, Dr. Britten and their committees, are to be congratulated on approaching the first of their goals through the publication of this uniquely practical series of volumes. *D. Y. Solandt*

Milk and Food Sanitation Practice. *By H. S. Adams, B.Sc., Chief, Bureau of Environmental Hygiene, Division of Public Health, Minneapolis, and Lecturer, School of Public Health, University of Minnesota. New York: The Commonwealth Fund, 1947. 311 pages. $3.25.*

THIS book provides a much-needed text to fill the gap that so often exists between theory and practice in the field of environmental sanitation and in particular food control. The author stresses throughout his book the importance of education as a means of accomplishing the desired sanitary control of food and milk supplies.

The first half of the book presents in a practical manner a complete picture of milk sanitation starting with the history and the public-health importance of milk control down through the planning of a milk-control program; the essential steps of sanitary milk production; details on pasteurization and its practice and the laboratory procedures used in milk control. In addition, he has included a chapter on the control of frozen desserts.

The last half of the book on food sanitation, while containing references to United States legislation which will be of only passing interest to Canadians, provides an excellent reference with numerous diagrams and photographs of practical procedures in the sanitary handling of foods and utensils in food establishments. The last chapter on the instruction and training of food handlers will provide excellent material for medical officers of health and their staffs in the preparation of lectures and training courses in sanitation which they might undertake in their community. While some of the procedures might be considered controversial, the material in this chapter, which includes in its appendices outlines of actual lectures as well as an excellent bibliography on source material, will be in my opinion invaluable to anyone interested in the educational aspects of sanitation. *J. H. Baillie*

Henrici's Molds, Yeasts, and Actinomycetes. *A Handbook for Students of Bacteriologists. 2nd ed., revised by Charles E. Skinner, Ph.D., Chester W. Emmons, Ph.D., and Henry M. Tsuchiya, Ph.D. New York: John Wiley and Sons, Inc., 1947. 409 pages. $5.00.*

THE purpose of the original and present authors of this text was to provide a discussion of molds, yeasts and actinomycetes for

students of bacteriology. That this purpose has been admirably achieved is beyond question. While a simpler text might be more suitable for and acceptable to undergraduate students and other beginners, the advanced student or worker in bacteriology would find invaluable help and stimulation in this presentation. Indeed it is interesting to speculate that if bacteriologists had had a greater familiarity with molds the antibiotic age might not have been so long delayed.

One does not need to be an expert mycologist to recognize the high quality of this work. The basic, scientific treatment of the many interesting facets in these fields of microbiology makes it of fundamental, indispensable value. The emphasis on medical and industrial applications lends additional attraction to workers in those spheres.

It is unfortunate that, for reasons beyond the authors' control, the chapter on antibiotic substances should be rather sketchy and limited. However, in view of the many other sources of information on the antibiotics, this shortcoming is not a serious one.

F. O. Wishart